BSS Network Doctor Reports

Contents

Contents 3

List of tables 9

List of figures 10

1 About this manual 19
1.1 Summary of changes **19**
1.2 What you need to know first **21**
1.3 Where to find more **21**
1.4 Typographic conventions **22**
1.4.1 Text styles **22**
1.4.2 Command line conventions **22**
1.5 Terms and concepts **23**
1.5.1 Abbreviations **23**
1.5.2 Terms **24**

2 Introduction to BSS Network Doctor 27
2.1 Prerequisites for the effective analysis of the network **27**
2.2 Monitoring the quality of a cellular network **29**
2.3 Reporting procedures **29**
2.3.1 Performance indicator **30**

3 Using BSS Network Doctor 31
3.1 Navigating with reports, formulas and counters **33**

4 User interface 35
4.1 Report layout **36**
4.2 Focusing your report selection **37**
4.2.1 BTS area selection **37**
4.2.2 Area selection based on a maintenance region **37**
4.2.3 Area selection based on a BSC **38**
4.2.4 Time period selection **38**
4.3 User log **38**
4.4 Report menus **40**
4.4.1 Fault management **41**
4.4.2 Configuration management **41**
4.4.2.1 Find cell **41**
4.4.2.2 Checks **42**
4.4.2.3 Adjacencies **43**
4.4.2.4 Named parameter set audit **43**
4.4.2.5 Network entities **43**
4.4.2.6 Frequencies **44**
4.4.2.7 Cell coverage **44**
4.4.3 Performance management BSS **44**
4.4.3.1 Administration **44**
4.4.3.2 SDCCH and TCH access, availability **45**
4.4.3.3 Handover **45**

4.4.3.4 Drop call **45**
4.4.3.5 Traffic and load **46**
4.4.3.6 Interference, quality and link balance **46**
4.4.3.7 IUO **47**
4.4.3.8 Call success **47**
4.4.3.9 BSS transmission availability and quality **47**
4.4.3.10 GPRS **48**
4.4.3.11 AMR, Adaptive multirate **48**
4.4.3.12 PBS, Position based services **49**
4.4.3.13 Other **49**
4.4.4 Benchmark and analysis **49**

5 Actions to take before using the reports 51
5.1 Checking the PLMN object **51**
5.1.1 PLMN object name **51**
5.1.2 PLMN object instance **51**
5.2 Checking a BTS object instance **51**
5.3 Estimating the load on Nokia NetAct **52**
5.3.1 Load on Nokia NetAct **52**
5.3.2 Active measurements in the BSC **53**
5.3.2.1 How to check what measurements send data to the database **53**
5.3.2.2 How to see which BSCs send data to the database **55**
5.3.2.3 How to set the measurements **56**
5.3.3 Measurement flow from a BSC **62**
5.4 Checking observations **63**
5.5 Checking blocked or filtered alarms **64**
5.6 Checking the maintenance region assignments **64**
5.6.1 Using maintenance regions for reporting **64**
5.6.2 Common mistakes **65**
5.6.3 How to see the MR division **65**
5.6.4 How to find errors in assignments **68**
5.7 Setting the history windows **69**

6 Consistency checks 71
6.1 Adjacencies **72**
6.1.1 Adjacencies to non-existing cells **72**
6.1.2 Adjacency discrepancies **73**
6.1.3 Non-symmetrical adjacencies **74**
6.1.4 Same or adjacent frequencies in adjacent cells **75**
6.1.5 Handover synchronisation between adjacent cells **77**
6.1.6 Adjacent cell double frequency check **78**
6.1.7 Adjacent cells having the same NCC, BCC and BCCH frequency **79**
6.2 Non-unique CI and LAC **79**
6.3 Base station audit **80**
6.3.1 Area level counts **80**
6.3.2 BSC parameter survey **82**
6.3.3 BTS level deviations **88**
6.4 Checking the adjacency plan **90**
6.5 Checking the frequency plan **97**
6.6 Checking the administrative states **98**
6.7 BTS state conflict between BSC and MSC **99**

6.8 Parameters **100**
6.8.1 AMR parameters **100**
6.8.2 EGPRS parameters **100**

7 Quality of the radio network plan 101
7.1 SDCCH drop ratio **102**
7.1.1 SDCCH drop ratio on area level **102**
7.1.2 SDCCH drop ratio on BTS hit list **103**
7.1.3 SDCCH drop ratio on BTS level **104**
7.2 TCH drop call ratio **105**
7.2.1 TCH drop call ratio on area level **105**
7.2.2 TCH drop call ratio on BSC level **107**
7.2.3 TCH drop call ratio on BTS hit list **108**
7.2.4 TCH drop call ratio on BTS level **110**
7.2.5 TCH observation **111**
7.2.6 Drop call trace **112**
7.3 Handover failure ratio **114**
7.3.1 Handover failure ratio on BTS area level **114**
7.3.2 Handover failure ratio on BTS hit list level **118**
7.3.3 Handover failure ratio on adjacency hit list level **118**
7.3.4 TRHO handovers (AMH) **119**
7.3.5 DADLB handovers **120**
7.3.6 Handover failure ratio on BTS level **120**
7.4 Location update success **124**
7.4.1 Location update success on BSC level **124**

8 Cell dimensioning 125
8.1 Finding the existing dimensioning problems in the network **125**
8.2 Finding the future dimensioning problems in the network **125**
8.3 SDCCH congestion and blocking **125**
8.3.1 SDCCH congestion and blocking on area level **126**
8.3.2 SDCCH congestion and blocking on BTS hit list **126**
8.3.3 SDCCH congestion and blocking on BTS level **128**
8.4 TCH congestion and blocking **129**
8.4.1 TCH congestion on area level **129**
8.4.2 TCH congestion and blocking on BTS hit list **130**
8.4.3 TCH congestion and blocking on BTS level **132**
8.5 Traffic **133**
8.5.1 Hourly traffic on BSC level **133**
8.5.2 Traffic on area level **134**
8.5.3 Traffic on BTS hit list level **136**
8.5.4 Traffic on BTS level **137**
8.6 Miscellaneous **140**

9 Call success 145
9.1 Traffic channel access and success **145**

10 Transmission 149
10.1 Transmission alarms **149**
10.2 Cell outage **150**
10.3 Transmission availability and quality **151**

10.4 Transmission object profiles 154

11 Network element availability 169
11.1 Availability of transceivers 169
11.1.1 Availability of transceivers on BSC level 169
11.2 Availability of time slots 170
11.2.1 Availability of SDCCH and TCH on area level 170
11.2.2 Availability of time slots on BTS hit list 170
11.2.3 Availability of SDCCH and TCH on BTS level 171
11.3 BSC units 172

12 Interference 173
12.1 Uplink interference 173
12.1.1 Uplink interference on area level 173
12.1.2 Uplink interference on BTS hit list 174
12.1.3 UL interference on BTS level 177
12.2 Interference from the same or adjacent frequencies 178

13 Intelligent underlay-overlay 181
13.1 Intelligent underlay-overlay on area level 181
13.2 Intelligent underlay-overlay on BTS level 182

14 Network configuration 193
14.1 Network configuration summary 193
14.2 BSC option statistics 196
14.3 Network entities 197
14.4 BSC and BCF software deployment 201
14.5 BCF hardware type deployment 201
14.6 Frequencies 202

15 Alarms 207
15.1 Alarm types and counts 207
15.2 Number of alarms per object 209
15.3 Alarm statistics 211
15.4 Alarm statistics by cells 212
15.5 Active BCCH missing (2567, 7767) alarms 212
15.6 Alarm sum time by cells 213

16 Locating network elements 215
16.1 All base station sites per maintenance region 215
16.2 All BTSs with LAC and CI 215
16.3 BS sites having the given character string in the name 216
16.4 Cells having the given CI and LAC 217
16.5 Cells having an adjacent cell with the given CI and LAC 217

17 Named sets 219

18 Half/Full rate 223

19 GPRS 225
19.1 GPRS KPI (229) 226

19.2 UL PS traffic (237) **230**
19.3 DL PS traffic (238) **231**
19.4 Territory upgrade and downgrade (239) **232**
19.5 Cells by multislot requests and allocations (228) **233**
19.6 TBF PI (254) **234**
19.7 Frame relay, detailed (240) **236**
19.8 Frame relay, short (243) **238**
19.9 GPRS counters (235) **239**
19.10 Cell related SGSN counters (700) **242**
19.11 Find cells having GPRS enabled TRXs (051) **244**
19.12 Routing areas (103) **246**
19.13 EGPRS Parameters (055) **246**
19.14 PBCCH availability (255) **247**

20 Adaptive multirate 251
20.1 Distribution of call samples by codecs and quality classes (BER) (244) **251**
20.2 Distribution of call samples by codecs and quality classes (FER) (245) **253**
20.3 AMR call time and quality, dynamic time and object aggregation (246) **255**
20.4 Transcoder failure ratio (247) **256**
20.5 Codec set modification failure ratio (248) **257**
20.6 AMR counters summary (249) **258**
20.7 AMR parameters (053) **261**

21 Position based services 263
21.1 Position based services (260) **263**

22 Quality of service 265
22.1 Quality of service (270) **265**
22.2 Quality survey (800) **266**

23 Other measurable qualities 269
23.1 Uplink and downlink quality and level **269**
23.1.1 Uplink and downlink quality on area level **269**
23.1.1.1 Reports based on RX quality **269**
23.1.1.2 Reports based on RX level statistics **270**
23.1.2 Uplink and downlink quality on TRX hit list **271**
23.1.2.1 Reports based on RX quality **271**
23.1.2.2 Reports based on RX level statistics **271**
23.1.3 Uplink and downlink quality on BTS level **272**
23.1.3.1 Reports based on RX quality **272**
23.1.3.2 Reports based on RX level statistics **274**
23.2 Link balance **275**
23.2.1 Link balance on area level **275**
23.2.2 Link balance on BTS hit list **276**
23.2.3 Link balance on BTS level **279**
23.3 MS speed **280**
23.3.1 Cells by MS speed (233) **281**
23.4 Handover **282**

23.4.1 TRHO handovers (155) **282**
23.4.2 DADLB handovers (156) **283**
23.4.3 Intra BSS HO observation statistics (158) **283**
23.5 Cell coverage **285**
23.5.1 Dominant distance range on BTS list **285**
23.5.2 Distance ranges on BTS hit list **286**
23.5.3 Distance range distribution on BTS level **286**
23.6 Handover cause **287**
23.6.1 Handover cause on area level **287**
23.6.2 Handover cause on BTS hit list **288**
23.6.3 Handover cause on BTS level **289**
23.7 BSC clear codes **290**
23.7.1 BSC clear codes on network level **291**
23.7.2 BSC clear codes on BSC level **293**
23.7.3 Cell analyzer **293**
23.8 Troubleshooting **294**
23.9 Dual band **298**
23.10 HSCSD **299**
23.10.1 HSCSD counters (241) **299**
23.10.2 HSCSD KPIs **301**

24 Benchmark and analysis 303
24.1 Performance statistics (benchmark) (200) **303**
24.2 Network benchmark statistics (204) **304**
24.3 Performance profiles for area, 24-hour/10-day breakdowns (207) **304**
24.4 BTS GSM KPI/PI table, dynamic object and time aggregation (205) **305**
24.5 TRX level GSM KPI/PI table, dynamic time aggregation (206) **308**
24.6 Cell doctor (213) **309**
24.7 Cell analyser (216) **309**
24.8 Base station site check (221) **310**

Appendix A. 313

Index 317

List of tables

Table 1. Text styles in this document **22**
Table 2. Command line conventions **23**
Table 3. Abbreviations **23**
Table 4. Terms used in this document **25**
Table 5. BSS measurements **57**
Table 6. Example of history windows in the Nokia NetAct database **69**
Table 7. KPI columns in report 229, GPRS KPI **227**
Table 8. Columns in report 240, Frame relay (detailed) **236**
Table 9. Columns in report 243, Frame relay (short) **238**
Table 10. Modified reports **313**
Table 11. Changes in KPIs used in reports **316**

List of figures

Figure 1. General work process **32**

Figure 2. Interrelationship between BSS Network Doctor reports and the formulas and counters used in them. **34**

Figure 3. BSS Network Doctor user interface **36**

Figure 4. BTS area selection menu. **37**

Figure 5. Area selection based on a maintenance region (MR) menu. **38**

Figure 6. Area selection based on a BSC menu. **38**

Figure 7. Time period selection menu. **38**

Figure 8. Report 512: Log statistics **39**

Figure 9. Report 513: Network Doctor use statistics **40**

Figure 10. Report 127: Last BSS measurement record times **54**

Figure 11. Report 126: Records for a measurement type, over BSC **55**

Figure 12. Report 121: First and last measurement record times for each BSC **56**

Figure 13. Report 122: Records for a measurement type, over BTS area **62**

Figure 14. Report 124: TCH and SDCCH observation records **63**

Figure 15. Assignment of objects to a maintenance region. **64**

Figure 16. Report 090: Network configuration summary **68**

Figure 17. Report 065: Adjacencies to non-existing or foreign cells **72**

Figure 18. Report 060: Adjacency discrepancies **74**

Figure 19. Report 061: Non-symmetrical adjacencies **75**

Figure 20. Report 062: Frequency check of adjacent cells **76**

Figure 21. Report 067: Handover synchronisation **78**

Figure 22. Report 069: Adjacent cell double frequencies **79**

Figure 23. Report 076: Adjacent cells having the same NCC, BCC and BCCH frequency **79**

Figure 24. Report 066: Non-unique CI and LAC **80**

Figure 25. Report 068: BTS parameter survey **82**

Figure 26. Report 077: BSC parameter survey **88**

Figure 27. Report 063: BTS audit **90**

Figure 28. Report 074: Adjacencies of cells **91**

Figure 29. Report 070: BTSs with maximum number of adjacencies **91**

Figure 30. Report 071: BTSs with minimum number of adjacencies **91**

Figure 31. Report 072: Defined, undefined and used adjacencies of a cell **95**

Figure 32. Report 073: Undefined adjacent cells **96**

Figure 33. Report 075: BTSs with maximum number of adjacencies between LAs **96**

Figure 34. Report 111: Frequency plan **98**

Figure 35. Report 050: Find locked BCFs, BTSs, TRXs and channels **99**

Figure 36. Report 078: BTS state conflict between BSC and MSC **100**

Figure 37. Daily values as shown in report 200, Performance statistics (benchmark). **102**

Figure 38. Averages as shown in report 204, Network benchmark statistics. **102**

Figure 39. Averages and components of SDCCH failures as shown in report 204, Network benchmark statistics. **103**

Figure 40. Report 166: SDCCH drop ratio per cell **104**

Figure 41. BTS level data on SDCCH drop ratio as shown in report 216, Cell analyser. **105**

Figure 42. Averages and components of TCH failures as shown in report 204, Network benchmark statistics. **106**

Figure 43. Report 160: TCH drop call statistics by days across area **107**

Figure 44. Report 162: TCH drop call statistics per day in each BSC **108**

Figure 45. Report 163: Cells having high TCH drop call ratio **110**

Figure 46. Averages of TCH drop call ratio over a period of time in report 216, Cell analyser. **111**

Figure 47. Report 217: SDCCH, TCH and BSC out HO observation statistics **112**

Figure 48. Report 225:Drop call trace **114**

Figure 49. Daily averages of handover failure ratio in report 200, Performance statistics (benchmark). **116**

Figure 50. Handover averages and components as shown in report 204, Network benchmark statistics. **118**

Figure 51. Report 150: Cells having high HO failure ratio **118**

Figure 52. Report 153: Adjacencies having high HO failure ratio **119**

Figure 53. Report 155: TRHO handovers (AMH) **119**

Figure 54. Report 156: DADLB handovers **120**

Figure 55. BTS level handover failure ratios as shown in report 216, Cell analyser. **123**

Figure 56. The worst cases of failing adjacencies in report 216, Cell analyser. **123**

Figure 57. Adjacencies and failures as shown in report 213, Cell doctor. **124**

Figure 58. Report 203: Location update success ratio per BSC **124**

Figure 59. SDCCH congestion and blocking as shown in report 204, Network benchmark statistics. **126**

Figure 60. SDCCH congestion and blocking as shown in report 200, Performance statistics (benchmark). **126**

Figure 61. Report 130: Cells having SDCCH congestion **128**

Figure 62. BTS level data on SDCCH congestion and blocking in report 216, Cell analyser. **128**

Figure 63. Area level data on TCH congestion in report 204, Network benchmark statistics. **129**

Figure 64. Area level data on TCH congestion as shown in report 200, Performance statistics (benchmark). **129**

Figure 65. Report 135: Cells having TCH congestion **131**

Figure 66. Report 138: Cells having high TCH raw blocking **131**

Figure 67. Report 182: Busy hour traffic for all BTSs **132**

Figure 68. BTS level data on TCH congestion and blocking as shown in report 216, Cell analyser. **133**

Figure 69. Report 180: TCH traffic (Erlang) per hour for each BSC **134**

Figure 70. Report 200: Daily sums of traffic in report 200, Performance statistics (benchmark). **134**

Figure 71. Report 222: Call distribution per LA **135**

Figure 72. Hourly area-level traffic in report 207, Performance profiles for area, 24-hour/10-day breakdowns. **136**

Figure 73. Report 182: Busy hour traffic for all BTSs **136**

Figure 74. Report 185: Cells having maximum TCH traffic **137**

Figure 75. BTS level data on traffic averages over the whole period in report 216, Cell analyser. **138**

Figure 76. Report 181: Daily TCH traffic profile for a BTS **140**

Figure 77. Report 184: BSC unit load for each BSC **141**

Figure 78. Report 186: Cells having maximum paging traffic **141**

Figure 79. Report 187: Cell location updates **142**

Figure 80. Report 188: Cells having peak RACH load **142**

Figure 81. Report 189: Cells sorted out by SDCCH or TCH holding time **143**

Figure 82. Report 202: Cells having most delete indications and P-Imm.Ass.NACK **144**

Figure 83. Call success factors in report 204, Network benchmark statistics **146**

Figure 84. Call success factors as daily values in report 200, Performance statistics (benchmark) **146**

Figure 85. Area-level success ratios on hourly level in report 207, Performance profiles for area, 24-hour/10-day breakdowns **147**

Figure 86. Report 250: Cells by call success ratio **147**

Figure 87. Report 251: Call success profiles of a cell **148**

Figure 88. Report 030: BSC alarm breakdown **150**

Figure 89. Report 027: Cell outage breakdown over 10 days **151**

Figure 90. Report 518: Transmission statistics **154**

Figure 91. Report 515: DMR profile **155**

Figure 92. Report 516: DN2 profile **156**

Figure 93. Report 517: TRU profile **156**

Figure 94. Report 522: BSC ET profile **162**

Figure 95. Report 523: BSC TCSM profile **166**

Figure 96. Report 525: TRE profile **166**

Figure 97. Report 526: TRE-SEL profile **167**

Figure 98. Report 131: Unavailability classification per BSC **169**

Figure 99. Area level data on SDCCH and TCH availability in report 200, Performance statistics (benchmark). **170**

Figure 100. Report 139: Cells having unavailable radio time slots **171**

Figure 101. BTS level data on SDCCH and TCH availability in report 216, Cell analyser. **171**

Figure 102. Report 215: Availability per BSC unit **172**

Figure 103. Area level data on uplink interference in report 200, Performance statistics (benchmark). **174**

Figure 104. Report 190: Cells having UL interference, 24-hour/10-day breakdowns **177**

Figure 105. BTS level data on UL interference in report 216, Cell analyser. **178**

Figure 106. Report 401: Cells by average traffic absorption to super TRXs **181**

Figure 107. Report 402: Cells by busy hour traffic absorption to super TRXs **182**

Figure 108. Report 400: IUO counters of a cell **190**

Figure 109. Report 403: KPI statistics for IUO cells **191**

Figure 110. Report 404: IUO measurement data per BTS **191**

Figure 111. Report 405: Adjacent cells with the same or adjacent frequency, IUO super TRX excluded **192**

Figure 112. Report 407: C/I statistics **192**

Figure 113. Report 090: Network configuration summary **196**

Figure 114. Report 089: BSC option statistics **197**

Figure 115. Report 091: Maintenance regions **198**

Figure 116. Report 092: BSCs **198**

Figure 117. Report 093: MSCs **198**

Figure 118. Report 094: HLRs **199**

Figure 119. Report 095: Base station sites of a maintenance region **199**

Figure 120. Report 096: Location areas **199**

Figure 121. Report 097: PLMNs **200**

Figure 122. Report 054: Segment configuration **200**

Figure 123. BCF and BSC software deployment in report 204, Network benchmark statistics. **201**

Figure 124. Occurrences of different BCF hardware releases in a BTS area in report 204, Network benchmark statistics. **201**

Figure 125. Report 099: BCF software and hardware type statistics **202**

Figure 126. Report 110: Occurrence of frequencies **203**

Figure 127. Report 111: Frequency plan **205**

Figure 128. Report 047: Find cells having the given frequency **205**

Figure 129. Report 034: Alarm types and counts **208**

Figure 130. Report 035: Alarm types and counts for BSC **209**

Figure 131. Report 036: Number of alarms per object **211**

Figure 132. Report 020: Alarm statistics **211**

Figure 133. Report 023: Alarm statistics by cell **212**

Figure 134. Report 024: Active BCCH missing alarms **212**

Figure 135. Report 025: BTS alarm sum time by cells **214**

Figure 136. Report 041: All base station sites per maintenance region **215**

Figure 137. Report 043: All cells with LAC and CI **216**

Figure 138. Report 044: Find BS sites having the given character string in the name **216**

Figure 139. Report 045: Find cells having the given CI and LAC **217**

Figure 140. Report 046: Find cells having an adjacent cell with the given CI and LAC **217**

Figure 141. Report 080: Number of named parameter sets **219**

Figure 142. Report 081: Named sets used **220**

Figure 143. Report 082: Allocation of a named set **221**

Figure 144. Report 236: Cells having max. HTCH traffic **223**

Figure 145. Report 237: UL PS traffic **231**

Figure 146. Report 238:DL PS Traffic **232**

Figure 147. Report 239:Territory upgrade, downgrade **233**

Figure 148. Cells by multislot requests and allocations (228) **234**

Figure 149. TBF PI (254) **236**

Figure 150. Report 235: GPRS counters **242**

Figure 151. Report 700: Cell related SGSN counters **244**

Figure 152. Report 051: Find cells having GPRS enabled TRXs **246**

Figure 153. Report 103: Routing area **246**

Figure 154. Report 055: EGPRS Parameters **247**

Figure 155. Report 255: PBCCH availability **249**

Figure 156. Report 244: Distribution of call samples by codecs and quality classes, S10 (BER) **252**

Figure 157. Report 245: Distribution of call samples by codecs and quality classes ,S10 (FER) **255**

Figure 158. Report 246: AMR call time and quality, dynamic time and object aggregation **256**

Figure 159. Report 247: Transcoder failure ratio **257**

Figure 160. Report 248: Codec set modification failure ratio **258**

Figure 161. Report 249: AMR counters summary **260**

Figure 162. Report 053: AMR parameters **262**

Figure 163. Report 260: Position Based Services (PBS) **264**

Figure 164. Report 270: Quality of service **266**

Figure 165. Report 800: Quality survey **268**

Figure 166. Area level data on UL and DL quality in report 200, Performance statistics (benchmark). **270**

Figure 167. Average distribution of UL and DL quality in report 204, Network benchmark statistics. **270**

Figure 168. Average distribution of UL and DL quality versus RX level range in the Network benchmark statistics (204) report. **270**

Figure 169. Report 196: UL and DL quality and UL interference per TRX, 24-hour/10-day breakdowns **271**

Figure 170. Report 197: UL and DL quality per TRX **272**

Figure 171. Worst and TRX specific values of UL and DL quality on the basis of RX quality in report 216, Cell analyser. **272**

Figure 172. Cumulative UL and DL quality on the basis of RX quality in report 216, Cell analyser. **273**

Figure 173. Hourly distribution of UL and DL quality in report 213, Cell doctor. **274**

Figure 174. BSC measurements based on Rx-level statistics in report 216, Cell analyser. **274**

Figure 175. Hourly distribution of UL and DL quality in report 213, Cell doctor. **275**

Figure 176. Link balance in report 195, Cells by DL and UL level balance **276**

Figure 177. Report 199: Link balance of an area **276**

Figure 178. Report 191: Cells having bad link balance **277**

Figure 179. Report 208: Link balance per cell **279**

Figure 180. BTS level data on link balance as shown in report 216, Cell analyser. **279**

Figure 181. BTS level data on link balance as shown in report 213, Cell doctor. **280**

Figure 182. Report 198: Cells by dominant link balance range. **280**

Figure 183. MS speed per measurement period in report 213, Cell doctor. **281**

Figure 184. Report 233: Cells by M **281**

Figure 185. Report 155: TRHO handovers **282**

Figure 186. Report 156: DADLB handovers **283**

Figure 187. Report 158:Intra BSS HO observation statistics **284**

Figure 188. Report 231: Cells by dominant distance range **286**

Figure 189. Report 232: Distance range distribution per cell **286**

Figure 190. Distance range distribution on the BTS level as shown in report 216, Cell analyser. **287**

Figure 191. Area level data on handover causes in report 204, Network benchmark statistics. **288**

Figure 192. Report 154: HO attempt cause distribution by cells **289**

Figure 193. BTS level data on handover cause in report 216, Cell analyser. **290**

Figure 194. Hourly handover cause counts in report 213, Cell doctor. **290**

Figure 195. Report 220: Clear code statistics **293**

Figure 196. Report 183: Low traffic cell check-up **295**

Figure 197. Report 164: Transcoder failures **296**

Figure 198. Report 134: Cells having RACH rejections **297**

Figure 199. Report 157: Cells having high HO attempts/call ratio **297**

Figure 200. Report 167: Cells having high drop call count in handovers **298**

Figure 201. Report 132: Cells having SMS establishment failures **298**

Figure 202. Distribution of single and dual band MS users in report 204, Network Benchmark statistics **298**

Figure 203. Single/dual band profile in report 213, Cell doctor. **299**

Figure 204. Report 241: HSCSD counters **301**

Figure 205. Report 242: HSCSD KPIS **302**

Figure 206. Report 205: BTS GSM KPI/PI table, dynamic object and time aggregation **307**

Figure 207. Report 206: TRX level GSM KPI/PI table, dynamic time aggregation **309**

Figure 208. Report 221: Base station site check. **312**

1 About this manual

This document explains the functional usage of the BSS Network Doctor software, the emphasis being on the practical tasks. The document does not introduce all reports available in BSS Network Doctor but focuses on the most useful ones.

The information contained in this document relates to BSS Network Doctor software version 3.1.3, Nokia NetAct Framework release and to release S10.5 of the Nokia BSC software. This document should only be used with Nokia NetAct and it should not be used with any other versions of Nokia BSC software. The formulas used in the reports can be subject to change without notice.

This document is intended for the network operators of the Nokia NetAct.

This chapter covers the following topics:

- What you need to know first
- Where to find more
- Typographic conventions
- Terms and concepts

1.1 Summary of changes

In this Change Delivery OSS CD 0091

The changes made to BSS Network Doctor software from version 3.1.2 to 3.1.3 are reflected in this document as follows:

Segment support has been added to reports 051, 229, 205, 155, 156 and 242. There is also a new Segment configuration report (054).

Support for Quality of Service (report 270) and PBCCH availability (report 255) measurements has been added. There are also new reports for AMR parameters (053) and EGPRS parameters (055).

New reports

- AMR parameters (053)
- Segment configuration (054)
- EGPRS parameters (055)
- PBCCH availability PI (255)
- Quality of service PI (270)

Removed reports

- Active measurements and observations (120)
- Objects with active observations (123)

For detailed information on the reports modified for this release, see Appendix A.

In the previous Change Delivery OSS CD 0081

As a result of the changes made to BSS Network Doctor software from version 12.5.1 to 3.1.2, the following changes have been made into this document:

New report

- BSS Performance Management > GPRS
    - TBF PI (254)

Modified reports

- Position based services (260)
    - formulas pbs_1, pbs_2, pbs_4 and pbs_5 have been replaced with pbs_1a, pbs_2a, pbs_4a and pbs_5a
    - formula pbs_8 has been added
- GPRS counters (235)
    - counters added related to average and peak TBF per tsl
- Cells having high TCH drop call ratio (163)
    - counter references for T-T HO corrected

The optional area level selection ‘BTS Group’ has been removed from reports due to problems in their administration.

In OSS3.1 Change Deliveries have replaced Functionality Notes as the delivery package for BSS Network Doctor.

Supported functions

There may be some minor differences between the formulas presented here and the formulas that BSS Network Doctor is using.

This version of BSS Network Doctor makes partial use of the new S10 functions.

1.2 What you need to know first

This document assumes that you are familiar with the following areas:

- The concepts of the Nokia Nokia NetAct and GSM networks in general
- The usage of the UNIX operating system and file system navigation
- The system administration tasks of the UNIX operating system. An overview of the responsibilities of the system administrator can be found in the HP-UX System Administration Concepts.
- A text processing utility, such as `vi` or `dtpad`. These text processors are used for editing certain configuration files.

1.3 Where to find more

When you perform the user's tasks described in this document, you may need to refer to other documentation for further information. Below is a list of manuals that you will find useful, as well as a brief description of the manual's contents.

BSS Network Doctor documentation

- *Administering BSS Network Doctor, DN98619369*, for administrator's tasks related to running BSS Network Doctor
- *BSS Network Doctor Formulas, DN98619493*, for counter formulas.

Other Nokia documents

- *Database Description for BSC Measurements, DN98619454*, for information on NMS database counters.
- *Call related DX causes in BSC, Functional description, DN9814277*, for an explanation of phases and list of causes. You need this if you try to analyse TCH and SDCCH observations.
- *Working Set Manager Help, DN00256783*, for the creation of working sets as a measurement scope that suits your needs.

1.4 Typographic conventions

The following tables present the typographic conventions which have been used in this manual to describe different actions and restrictions.

1.4.1 Text styles

The following table presents the typefaces and fonts and their indications.

Table 1. Text styles in this document

Style	Explanation
Initial Upper-case Lettering	Application names
Italiced text	Emphasis State, status or mode
`Courier`	File and directory names Names of database tables Parameters User names System output User input
UPPER-CASE LETTERING	Keys on the keyboard (ALT, TAB, CTRL etc.)
Bold text	User interface components
Initial Upper-case Lettering in Italics	Referenced documents Referenced sections and chapters within a document
`<bracketed text>`	Variable user input

1.4.2 Command line conventions

The following UNIX command line prompts are used to indicate which user should enter the command(s). Note that you should not include the prompt in the command.

Table 2. Command line conventions

Prompt	As which user
`#`	As the `root` user
`omc>%`	As the `omc` user
`&`	As any user

1.5 Terms and concepts

The lists below presents the terms and abbreviations used in this document.

1.5.1 Abbreviations

Table 3. Abbreviations

Abbreviation	Explanation
AMR	Adaptive Multirate
BAL	BCCH Allocation List
BCCH	Broadcast Control Channel
BCF	Base Control Function
BSC	Base Station Controller
BSS	Base Station Subsystem
BTS	Base Transceiver Station
CI	Cell Identity
DL	Downlink
GPRS	General Packet Radio Service
HO	Handover
HOC	Handover Control
HLR	Home Location Register
HSCSD	High speed circuit switched data
IUO	Intelligent Underlay Overlay
KPI	Key Performance Indicator

Table 3. Abbreviations (Continued)

Abbreviation	Explanation
LAC	Location Area Code
MML	Man-machine Language
MR	Maintenance Region
MS	Mobile Station
MSC	Mobile Services Switching Centre
OMC	Operation and Maintenance Centre
OSI	Open System Interconnection
PLMN	Public Land Mobile Network
PM	Performance Management
POC	Power Control
PBS	Position Based Services
RACH	Random Access Control Channel
SDCCH	Stand Alone Dedicated Control Channel
SMS	Short Message Service
SQL	Standard Query Language
TCH	Traffic Channel
TRX	Transceiver
TSL	Time Slot
UL	Uplink

1.5.2 Terms

The lists below presents the abbreviations and terms used in this document.

Table 4. Terms used in this document

Term	Explanation
BCCH allocation list	A managed object (MO) representing a set of frequencies in a broadcast control channel (BCCH) allocation.
Broadcast Control Channel (BCCH)	A channel from a base station to a mobile station (MS) used for transmission of messages to all mobile stations located in the cell coverage area
Cell Identity (CI)	A number which identifies a cell to the networks within a location area (LA).
Cell BTS sector/omni	Cell and BTS mean the same. One cell can comprise a sector of sectorised Base Station site or the whole cell in case of an omni Base Station.
Clear code	Code that describes why the call set-up or the call itself has been disconnected.
Day	The counting of data per day is based on the `period_start_time` field in the measurement tables. This field always tells the starting hour of the measurement period. Under one day there are hours from 00 to 23.
Key Performance Indicator	The performance of the network is calculated from Nokia NetAct based on the network element counter information. Sometimes the plain counter as such describes an important performance aspect (number of calls, for example) of the network but sometimes a formula of counters is needed (e.g. drop call ratio).
Maintenance Region	Each object in the Nokia NetAct database belongs to one and only one maintenance region (MR).
Measurement data	Data that includes both measurements and observations. Synonym for performance data.
Measurement report	A report of a specified measurement type that is generated after every output period.
Nokia NetAct	A product of Nokia Telecommunications for the operation and maintenance of cellular networks.
Performance data	See measurement data.

Table 4. Terms used in this document (Continued)

Term	Explanation
Reporting interval	The result output period of measurements, which the user can set. For MSC measurements the reporting interval is 5, 15, or 60 minutes, and for BSC measurements 15, 30 or 60 minutes, or 6, 12 or 24 hours.
SQL*Plus	An interactive program for accessing the database.
Stand-alone dedicated control channel (SDCCH)	A control channel (CCH) used for roaming, authentication, encryption activation and call control.
Timeslot (TSL)	A timeslot in the time division multiple access (TDMA) frame in the GSM radio interface.
Top-level User Interface	A graphical user interface (UI) in the Nokia Nokia NetAct Workstation based on windowing.

For any other terms, refer to *Glossary*, DN9763965.

2 Introduction to BSS Network Doctor

BSS Network Doctor is a reporting package which provides effective tools to cover all functional areas of Nokia NetAct: Configuration Management, Fault Management, and Performance Management (PM), with special focus on the needs of network planning, operation and maintenance.

Self-documented reports with front page description and column headers guarantee that the basic information is always where it is needed.

To install BSS Network Doctor, follow the instructions given in the BSS Network Doctor, System Administrator's Guide.

BSS Network Doctor offers a menu-based user interface where the user can move up and down the menu hierarchy. See chapter 4 ()*User interface*, for a list of all available reports.

BSS Network Doctor should not be used in an uncontrolled fashion, for example, by many NMS users simultaneously, because it increases the load on the system resources. To reduce the excessive use of BSS Network Doctor, ensure that BSS Network Doctor reports are available to all people who need the information. The results can be stored in a commonly known directory accessible to all necessary people, or distributed via mail or the Intranet.

Well-planned and controlled reporting reduces the load on Nokia NetAct by letting users get necessary data quickly without accessing the Top-level User Interface. The reports also allow for the study of the data off-line in a file or printout.

All basic measurements support a 60-minute reporting interval. If you need certain reports continuously, schedule the reports and execute them automatically. For instructions on automatic running, refer to BSS Network Doctor System Administrator's Guide.

2.1 Prerequisites for the effective analysis of the network

To analyse your network as efficiently as possible, ensure that:

Nokia NetAct configuration is optimal

- Nokia NetAct is correctly configured to collect the alarm and measurement data (this is normally done during commissioning)
- The correct measurements are activated in the network elements
- The transfer of measurement result files from the BSS to Nokia NetAct succeeds.

When Nokia NetAct and the network elements are correctly configured, Nokia NetAct can provide very valuable, continuous, network-wide information about the status of the network. Nokia provides a variety of services for network operations.

Correct scopes are used when running the reports

- For the scope of the BTS area, BSS Network Doctor provides you with the following parameters:
  - Maintenance region
  - BSC
  - LAC
  - A single BTS, all BTSs or all IUO BTSs
  - BSC SW version
  - Frequency band (of dual band)
  - BCF type (Base Station generation)
  - Working Set (manual, with BTSs or with BCFs)

    This is a new feature that allows you to limit your selection to a self-defined working set created by Working Set Manager, one of Nokia's NMS desktop applications.
- For the selection of the time period, you can define the following parameters:
  - Today
  - Absolute date
  - Relative date (ending on the current hour)
  - Relative date (ending the previous midnight)

Reports are distributed to the correct persons

When the reports from Nokia NetAct are available to users, the next problem you may have is that the resources to fix the problems are missing, not well defined, or that no training has been given.

2.2 Monitoring the quality of a cellular network

BSS Network Doctor provides you with a selection of reports to monitor the technical quality of a cellular network. This manual shows model reports of the more frequently used ones. The reports are discussed in the following chapters:

- Chapter 6, Consistency checks
- Chapter 7, Quality of the radio network plan (coverage, parameter optimisation)
- Chapter 8, Cell dimensioning (capacity)
- Chapter 9, Call success
- Chapter 10, Transmission (availability, capacity)
- Chapter 11, Network element availability
- Chapter 12, Interference
- Chapter 13, Intelligent underlay-overlay
- Chapter 14, Network configuration
- Chapter 15, Alarms
- Chapter 16, Locating network elements
- Chapter 17, Named sets
- Chapter 18, Half/Full Rate
- Chapter 19, GPRS
- Chapter 20, Adaptive multirate
- Chapter 21, Position based services
- Chapter 23, Other measurable qualities
- Chapter 24, Benchmark and analysis

2.3 Reporting procedures

The reports as such are tools. The operational procedures define how much value the reports bring. One important generic basic procedure related to the report counters can be described as follows.

2.3.1 Performance indicator

Network performance can be evaluated based on performance indicators such as TCH drop call ratio. Performance indicators are mapped directly to either a counter or a formula of several counters. Drop call ratio, for example, is currently a formula of several counters. Performance indicators should be:

- Monitored on *both the network and the area level* for seeing the trends.

  An example of a report that covers both the network and the area level is **Performance statistics (benchmark)** (200) which collects some of the most interesting indicators into the same report and shows the daily totals. If you wish to see the average or component values, you can use the report **Network benchmark statistics** (204).

- Monitored on *BTS level across the area* to spot the BTSs potential with problems. Often they are referred to as *BTS hit lists* or *Top n lists*.

  An example of a report at this level is **Cells having high TCH drop call ratio** (163) which helps to spot the BTSs which display a high drop-out ratio performance indicator \xb2 TCH drop-out ratio\xb2 .

- Analysed for a *specific BTS,* when the BTS has been found on the hit list.

  Performance indicators can be used for analysing a specific cell during a certain time period. This can be done using **Cell analyser** (216) to see the average and busy hour values and 10-day/24-hour profiles of the most important indicators ending on the selected day. **Cell doctor** (213) is used to see the details of the BTS on a per-hour basis for all counters. These reports provide you with data on the alarms and parameters of the cell as well.

If the information provided by the different counters is not adequate for sorting out the problem, then the following level of actions depends on the quality of the problem. For instance, the TCH drop calls may be investigated using the TCH observations.

The Nokia NetAct database contains a very large number of counters which all are elementary performance indicators. For practical purposes, however, they can be hard to interpret. BSS Network Doctor offers reporting facilities on both the area and BTS level for the most important performance indicators that often are referred to as *Key Performance Indicators*. For more information, see Performance Management Basic Operating Principles and Procedures.

3 Using BSS Network Doctor

Before you use BSS Network Doctor, ensure that the measurement flow from the measurement network elements in the investigated area is functioning. You may also want to check that the network is logically divided into suitable areas so that the division serves the purpose of reporting.

When enough consistent statistical data is available, you may run the reports and analyse the results, and then take any necessary actions based on the results. After this, you should verify the impact of actions by a new run of reports and a new analysis. This cycle of running reports, analysing them and modifying the network on the basis of the actions, continues through the whole lifespan of the network. Only the pace and scope of the key performance indicators may change from time to time.

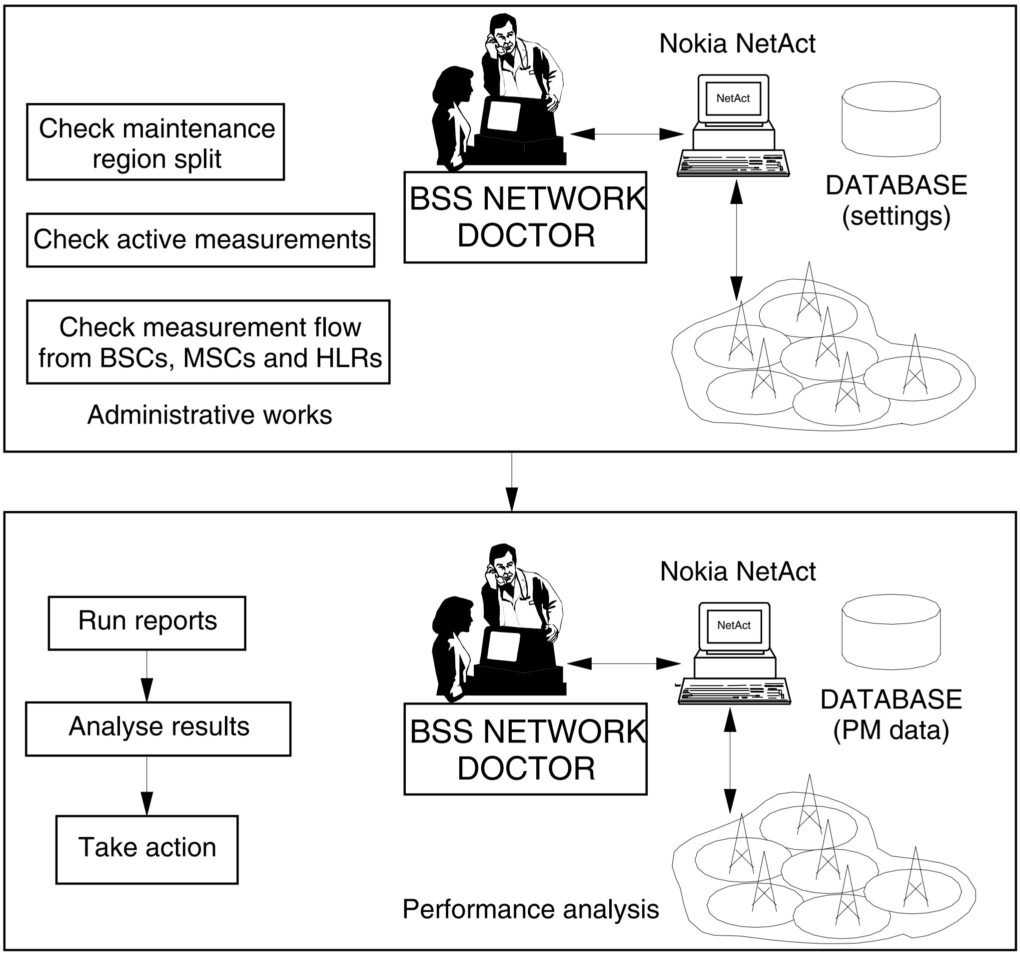

Figure 1. General work process

Top-level reports are a good place to start the analysis. They display the basic quality indicators for a BTS area over a period of time as total values as well as by profile presentation. Save the first reports and use them as comparison material for later evaluation of the impact of the actions taken.

Normally, your first action is to clean up the adjacency discrepancies and to check the parameter settings and the UL interference situation.

After the basic clean-up, you can start spotting other problems. If there is no traffic yet in the network (as usual before the network is launched), you can use the Nokia NetAct statistics mostly on alarms, configuration queries and UL interference analysis.

If the network is running, start locating the cells having potential problems and to troubleshoot them. If the network is new, the problems more commonly lie in an installation or equipment fault. Correcting these problems may require visits on the sites, but you can draw conclusions or get some indication of the nature of the problem from the cell statistics. When you have sorted out problems due to faulty equipment or faulty configuration, the remaining problematic cells may have problems with the radio network plan. You may have to tune the cell parameters or check the plan in general for the frequencies used or the environment.

3.1 Navigating with reports, formulas and counters

The data in the BSS Network Doctor reports is derived from counter formulas as well as directly from the Nokia NetAct database counters themselves. In the reports you can find IDs referring to the used formulas and counters at the beginning of the reports in the report description, or often also in the column headers of the tables.

You can search for reports containing a given formula or counter in the main window.

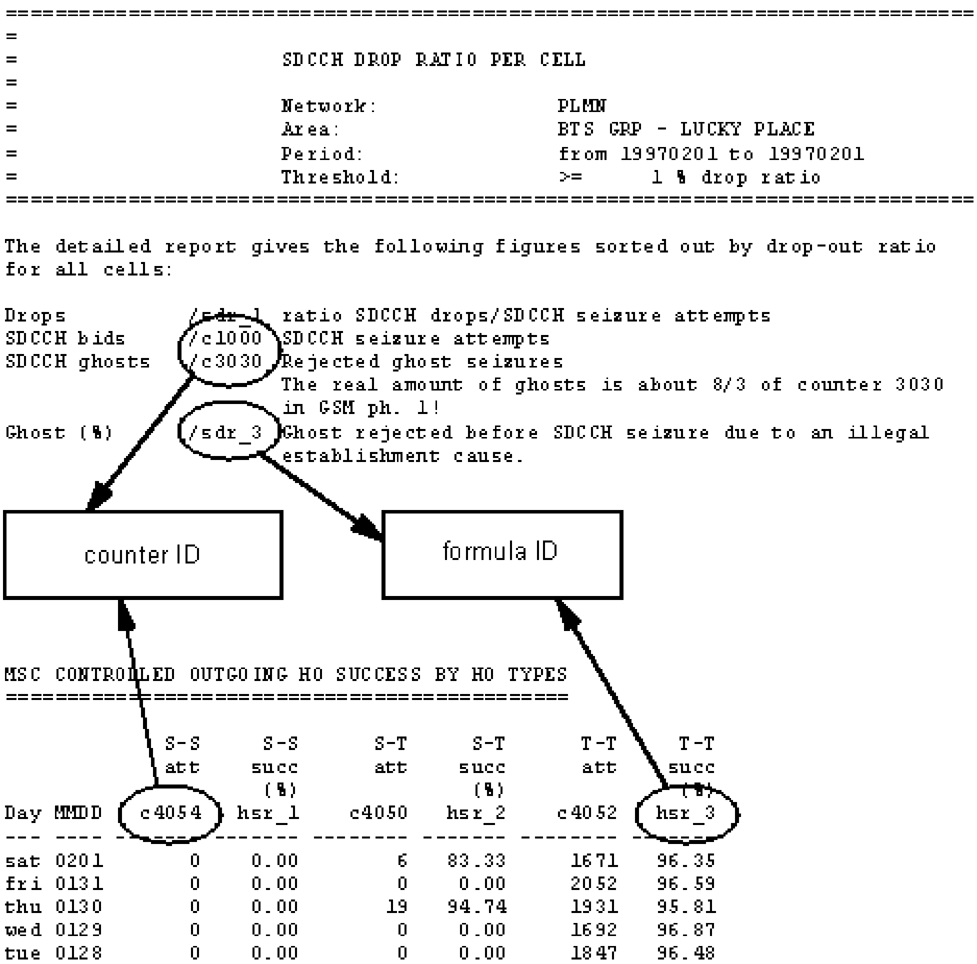

Figure 2. Interrelationship between BSS Network Doctor reports and the formulas and counters used in them.

To see the actual formulas, refer to *BSS Network Doctor Formulas ,dn98619493*, and if interested in the counters, see *Database Description for BSC Measurements, dn98619454*.

4 User interface

This chapter describes the BSS Network Doctor user interface and lists the reports in the order they appear on the menus.

BSS Network Doctor offers a menu-based user interface where the user can move up and down the menu hierarchy.

All reports are listed in the submenus. You can also run the reports directly from the main menu option **running by identification number**.

The reports produce an output file which opens in the `dtpad` editor window. You can then modify, if necessary, and save the report using the editor commands.

BSS Network Doctor also provides model reports. To display a model report, select **Display a model report by identification number** from the main menu.

As a model report does not cause any load on the database server, it is a good idea to learn about the BSS Network Doctor reports by viewing model reports first.

In addition, in the main window you can perform the following search functions:

- Search for reports containing a given formula
- Find description of a given formula
- Change history

  You can view the changes made to this software version as compared to the previous one published in web.

Note

As each submenu contains a shortcut for running any of the BSS Network Doctor reports, you can flexibly have access to any of them regardless of which menu you are viewing. Enter the report ID after:

- m) for viewing a model report
- r) for generating an actual report from the database

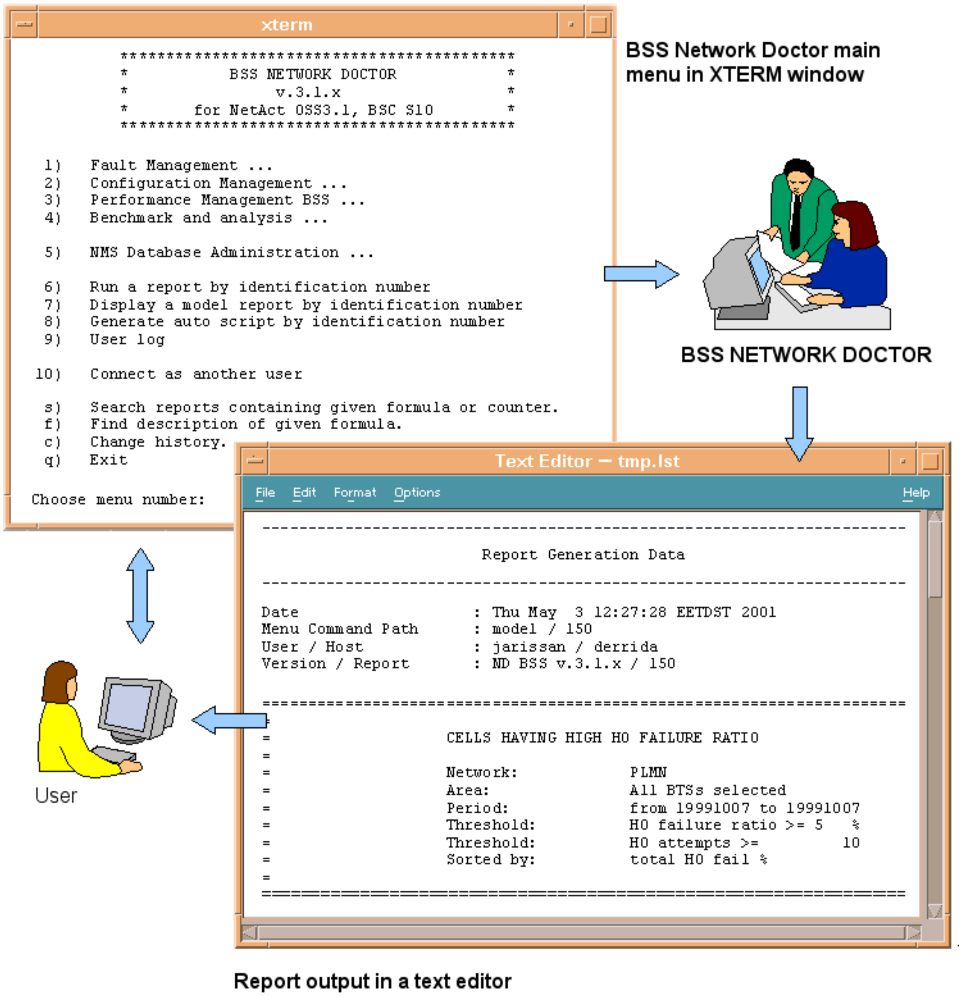

Figure 3. BSS Network Doctor user interface

4.1 Report layout

BSS Network Doctor reports are self-explanatory standard-size (56 lines per page and 80 characters per line) textual reports presented in a table format. Each report starts with a front page containing a description which helps you understand what the report is used for.

One of the benefits of BSS Network Doctor is that the output is a plain ASCII file in a readable and printable format and can thus be easily transferred and handled. For example, to be able to view the ASCII text file in MS Word, open the file in Word and change the font to Courier New, 8 pt.

4.2 Focusing your report selection

Before a report is generated, BSS Network Doctor will prompt you to make your selections for generating the report limited to certain network elements and periods of time. The common selections are:

- BTS area
- Area selection based on a BSC
- Area selection based on a maintenance region
- Time criteria

In addition to these, with some individual reports also other types of selections will be prompted for.

4.2.1 BTS area selection

You can select BTSs based on the following options:

```
BTS AREA SELECTION
==================

You can select BTSs based on the following options:

RET (default) = Maintenance Region
2             = BSC
3             = LAC
4             = Single BTS
5             = All BTSs
6             = All IUO BTSs
7             = BSC SW Version
8             = Frequency Band (of dualband)
9             = BCF Type (Base Station generation)
10            = Working Set (manual, with BTSs)
11            = Working Set (manual, with BCFs)
12            = Working Set (manual, with BSCs)
13            = MSC

Avoid causing extra load on Nokia
NetAct, use small area if applicable.

Please select option (RET = MR)        :
```

Figure 4. BTS area selection menu.

4.2.2 Area selection based on a maintenance region

```
Area selection based on Maintenance Region (MR)
===============================================

Maintenance Region   Ident
-------------------- ------
MR Name              1
```

```
Please enter MR Ident (RET = all, q = exit) :
```

Figure 5. Area selection based on a maintenance region (MR) menu.

4.2.3 Area selection based on a BSC

```
BSC Name             BSC id
-------------------- ------
ABBSC01              ABBSC0
ABBSC02              ABBSC0
ABBSC03              ABBSC0
ALBSC01              ALBSC0

Please enter BSC id (RET = all BSC, q = exit):
```

Figure 6. Area selection based on a BSC menu.

4.2.4 Time period selection

You can select the measurement period based on the following options:

```
TIME PERIOD SELECTION
=====================

You can select the measurement period based on the following option:

RET (default) = Today            (from 00:00 to current Hour)
1             = Absolute date    (user defined)
2             = Relative date    (end current hour)
3             = Relative date    (end yesterday midnight)

Please select option (RET = Today)      :
```

Figure 7. Time period selection menu.

4.3 User log

BSS Network Doctor provides you with reports for monitoring the user log data from the use of this application. These reports are common to both BSS and NSS Network Doctor.

The **Log statistics** (512) report gives basic information about the BSS Network Doctor log file.

```
OS User    Host       Package    Report     Start Time         Exec Time
Name       Name       Version    No         yyyy-mm-dd hh:mm         (s)
---------- ---------- ---------- ---------- ------------------ ---------
neva       nea        v.1.18.41  120        1997-12-22 15:53           3
```

```
                                603        1997-12-22 15:56            2
                                998        1997-12-22 15:56            2
teh         nea        v.1.18.41B 120        1997-12-18 15:09            1
                                120        1997-12-18 15:09            0
                                014        1997-12-18 16:00            5
                                020        1997-12-18 16:02           76
                                021        1997-12-18 16:03           17
                                021        1997-12-18 16:12           16
                                022        1997-12-18 16:16           10
                                023        1997-12-18 16:18          148
                                024        1997-12-18 16:20          147
                                25         1997-12-18 16:23            2
```

Figure 8. Report 512: Log statistics

The **Network Doctor use statistics** (513) report shows how many times a report has been used and its average execution time.

```
How many times a report
has been used and its average execution time

                 Average
               Execution
Report  Times       Time
Number   Used      (sec)
------ ------ ---------
120         1        17
122         4         4
127         1        59
163         2        11
196         1        27
200         2        84
204        17        48
207         1        58
212         5        22
213         3        16
218         6         3
252        10         3
512         1         6
515         8         3
516         5         9
517        25        12
519        11        55

        How many times a user has run a report

                                   Report  Times
Host         DB User    User       Number   Used
------------ ---------- ---------- ------ ------
nea          OMC        neva       120         1
                                   122         4
                                   163         2
                                   196         1
                                   200         1
                                   204         4
                                   213         3
                                   218         1
                                   252         3
                                   512         1
                                   515         5
                                   516         5
                                   517        25
                                   519         6
                        whe        200         1
```

		204	13
		207	1
		212	5
		252	7
Unknown	vsalline	127	1
		218	5
		515	3
		522	7
		523	12
		524	1

Figure 9. Report 513: Network Doctor use statistics

4.4 Report menus

The list below highlights the types of reports that BSS Network Doctor user interface provides for the collection of performance data from the telecommunications network.

Note

To avoid unnecessary load on the system, you should run a model report first by its ID to get an example of the type of report produced by BSS Network Doctor.

- Fault Management
- Configuration Management
  - Find Cell
  - Checks
  - Adjacencies
  - Named Parameter Set Audit
  - Network Entities
  - Frequencies
  - Cell Coverage
- Performance Management BSS
  - Administration
  - SDCCH and TCH Access, Availability
  - Handover
  - Drop Call
  - Traffic and Load
  - Interference, Quality and Link Balance
  - IUO
  - Call Success

- BSS Transmission Availability and Quality
- GPRS
- AMR
- PBS
- Other

- Benchmark and Analysis
- User Log

The following subsections describe briefly the contents of the different report types. The reports are listed as they appear on the menu, giving also the three-digit identification number in brackets.

4.4.1 Fault management

The reports on the Fault Management menu are used to analyse the stability of the network. For example, to analyse the stability first on the network level, use **Alarm types and counts** (034), and if interested in the frequency of interesting alarms, use the report **BSC alarm breakdown** (030). The reports available from this menu are:

- Alarm statistics (020)
- Number of alarms per object (036)
- Alarm types and counts (034)
- Alarm types and counts for BSC (035)
- Alarm statistics by cells (023)
- Active BCCH missing (2567, 7767) alarms (024)
- Alarm sum time by cells (025)
- Cell outage breakdown over 10 days (027)
- BSC alarm breakdown (030)

4.4.2 Configuration management

The reports on the Configuration Management menu provide you with data on the network configuration.

4.4.2.1 Find cell

The reports on the Find Cell menu allow you to find specific data on various network elements. The reports on this menu are:

- All base station sites per maintenance region (041)
- All radio network sorted out by BSC, BCF, BTS (042)
- All BTSs with LAC and CI (043)
- Find BS sites having the given character string in the name (044)
- Find cells having the given CI and LAC (045)
- Find cells having an adjacent cell with the given CI and LAC (046)
- Find cells having the given frequency (047)
- Find locked BCFs, BTSs, TRXs and channels (050)
- Find cells having GPRS enables TRXs (051)

4.4.2.2 Checks

Nokia NetAct contains a lot of data which must be consistent. For example, if the adjacent cell contains parameters which have to be the same as in the target cell, use the report **Adjacency discrepancies** (060) to check this. The reports in this menu are:

- Adjacencies to non-existing or foreign cells (slow, 065)
- Adjacency discrepancies (060)
- Non-symmetrical adjacencies (061)
- Frequency check of adjacent cells (062)
- Adjacent cell double frequencies (069)
- Adjacent cells of a cell having the same NCC, BCC and frequency (076)
- Non-unique CI and LAC (066)
- Handover synchronisation (067)
- BTS parameter survey (068)
- BTS audit (063)
- Maintenance region audit (064)
- BSC parameter survey (077)
- BTS state conflict between BSC and MSC (078)
- AMR parameters (053)
- EGPRS parameters (055)

4.4.2.3 Adjacencies

When checking the implementation of the network plan, adjacency is one of the reported items. Sometimes there are, for example, too many or too few adjacencies defined or accidentally implemented in the plan. The adjacency reports are:

- BTSs with maximum number of adjacencies (070)
- BTSs with minimum number of adjacencies (071)
- Defined, undefined and used adjacencies of a cell (072)
- Undefined adjacent cells (073)
- Adjacencies of cells (074)
- BTSs with maximum number of adjacencies to different location areas (075)

4.4.2.4 Named parameter set audit

Named parameter sets can be used for defining new or alternative parameter plans to check the usage. The Named Parameter Set Audit menu contains the following items:

- Number of named parameter sets per object type (080)
- Named sets used (081)
- Allocation of a named set (082)

4.4.2.5 Network entities

The reports on the Network Entities menu provide you with object summary data on various network element types. **BSC option statistics** (089), for example, shows the optional features that are used in the BSCs of the selected BTS area. The information in it is retrieved from the Nokia NetAct database that is updated only by the Upload command in the Top-level User Interface.

- Network configuration summary (090)
- Maintenance regions (091)
- BSCs (092)
- MSCs (093)
- HLRs (094)
- Base station sites of a maintenance region (095)
- Location areas (096)

- PLMNs (097)
- BCF software and hardware type statistics (099)
- BSC option statistics (089)
- Routing areas (103)
- Segment configuration (054)

4.4.2.6 Frequencies

The frequency plan is one of the basic network settings. Since the plan is often inserted via Nokia NetAct manually, errors may easily occur. You can check the plan manually using the report **Frequency plan** (111).

- Occurrence of frequencies (110)
- Frequency plan (111)

4.4.2.7 Cell coverage

Cell coverage reports are based on Timing advance measurement and provide data according to distance ranges and power classes.

- Cells by dominant distance range (231)
- Distance range distribution per cell (232)

4.4.3 Performance management BSS

The reports on the Performance Management BSS menu provide you with PM data on various levels.

4.4.3.1 Administration

The Administration menu reports contain data related to measurements, for example, are the measurements active and do they send data to the database.

- Last BSS measurement record times (127)
- First and last measurement record times for each BSC (121)
- Records for a measurement type, over BTS area (122)
- Records for a measurement type, over BSC (126)
- TCH and SDCCH observation records (124)
- Cells having undefined adjacent measurement results (125)

4.4.3.2 SDCCH and TCH access, availability

There are many aspects how the dimensioning of the network can affect the quality of the network. The most severe situation occurs when the user does not have access to the system. With the help of these reports you can monitor the BTS area level.

- Cells having RACH rejections (134)
- Cells having SDCCH congestion (130)
- Cells having TCH congestion (135)
- Cells having TCH blocking, raw and call blocking (138)
- Cells having unavailable radio timeslots (139)
- Unavailability classification per BSC (131)
- Cells having SMS establishment failures (132)

4.4.3.3 Handover

Handover (HO) is one of the basic features of the GSM network. The HO failure ratio is therefore a key quality indicator. With the help of these reports you can monitor the BTS area level.

- Cells having high HO failure ratio (150)
- Cells having high HO attempts/call ratio (157)
- TRHO handovers (155)
- DADLB handovers (156)
- Adjacencies having high HO failure ratio (153)
- HO attempt cause distribution by cells (154)
- Intra BSS HO observation statistics (158)

4.4.3.4 Drop call

The drop call ratio is one of the key features indicating the quality of SDCCH and TCH. With the help of these reports you can monitor the BTS area level.

- TCH drop call statistics by days across area (160)
- TCH drop call statistics per day in each BSC (162)
- Cells having high TCH drop call ratio (163)
- Transcoder failures (164)

- SDCCH drop ratio per cell (166)
- Cells having high drop call count in handovers (167)

4.4.3.5 Traffic and load

The reports on this menu provide you with data on the traffic and load.

- TCH traffic (Erlang) per hour for each BSC (180)
- Daily TCH traffic profile for a BTS (181)
- Busy hour traffic for all BTSs (182)
- Low traffic cell check-up (183)
- BSC unit load per hour for each BSC (184)
- Cells having maximum TCH traffic (185)
- Cells having maximum paging traffic (186)
- Cell location updates (187)
- Cells having highest RACH load (188)
- Cells sorted out by SDCCH or TCH holding time (189)
- Cells having most delete indications (202)
- Call distribution per LA (222)
- Cells having maximum HTCH traffic (236)

4.4.3.6 Interference, quality and link balance

Link quality is one of the quality indicators in the GSM network that can be affected by interference, for example. Link balance is one of the central concepts used in planning the GSM network.

Interference:

- Cells having UL interference, 24-hour/10-day breakdowns (190)

Quality:

- UL and DL quality and UL interference per TRX, 24-hour/10-day breakdowns (196)
- UL and DL quality per TRX (197)

Link balance:

- Cells by DL and UL level balance (195)
- Cells by dominant link balance range (198)
- Cells having bad link balance (191)
- Link balance per cell (208)
- Link balance of an area (199)

4.4.3.7 IUO

The reports in this menu provide you with data on traffic absorption and intelligent underlay-overlay counters on the BTS level.

- Cells by average traffic absorption to super TRXs (401)
- KPI statistics for IUO cells (403)
- Cells by busy hour traffic absorption to super TRXs (402)
- IUO counters of a cell (400)
- Frequency check of adjacent cells (IUO super TRX excluded) (405)
- IUO measurement data per BTS (404)
- C/I statistics (407)

4.4.3.8 Call success

The reports in this menu provide you with data on call success.

- Cells by call success ratio (250)
- Call success profiles of a cell (251)

4.4.3.9 BSS transmission availability and quality

The reports of this menu provide you with statistics about the availability and quality of BSS transmission, giving profiles for DMR, DN2 and TRU with data on the duration of errored seconds, for example.

- Transmission statistics (518)
- DMR profile (515)
- DN2 profile (516)
- TRU profile (517)
- BSC ET profile (522)

- BSC TCSM profile (523)
- TRE profile (525)
- TRE-SEL profile (526)

4.4.3.10 GPRS

BSS Network Doctor provides several reports on GPRS collected into one menu.

- GPRS KPI (229)
- UL PS traffic (237)
- DL PS traffic (238)
- Territory upgrades and downgrades (239)
- Cells by multislot allocations (228)
- TBF PI (254)
- Frame relay, detailed (240)
- Frame relay, short (243)
- PBCCH availability PI (255)
- Cell Doctor. Most GPRS counters in PCU measurement. (213)
- GPRS counters (235)
- Cell related SGSN counters (700)
- Find cells having GPRS enabled TRXs (051)
- Routing areas (103)

4.4.3.11 AMR, Adaptive multirate

- Distribution of call samples by codecs and quality classes BER (244)
- Distribution of call samples by codecs and quality classes FER (245)
- AMR call time and quality, dynamic time and object aggregation (246)
- Transcoder failure rates (247)
- Codec set modification failure ratio (248)
- AMR counters summary (249)
- AMR parameters (053)

4.4.3.12 PBS, Position based services

- Position based services (260)

4.4.3.13 Other

- Clear code statistics (220)
- Location update success ratio per BSC (203)
- Cells by MS speed (233)
- HSCSD counters (241)
- HSCSD KPIs (242)
- Quality of service (270)

4.4.4 Benchmark and analysis

Benchmark

Performance indicators need to be monitored on network and area level for seeing the trends. An example of a report from these network levels is **Performance statistics (benchmark)** (200) which collects some of the most interesting indicators into the same report showing the daily totals. If you wish to see the averages you can use the report **Network benchmark statistics** (204).

- Performance statistics (bencmark) (200)
- Network benchmark statistics (204)
- Performance profiles for area, 24-hour/10-day breakdowns (207)
- BTS GSM KPI/PI table, dynamic object and time aggregation (205)
- TRX level GSM KPI/PI table, dynamic time aggregation (206)

Analysis

- BSC doctor (212)

  This report is used for investigating BSC performance management data and problems which can occur in the BSC. Performance needs to be analysed for a *specific BTS* when the BTS has been found on the hit list.

- Cell analyser (216)

  You can use this report to see the average and busy hour values and 10-day/24-hour profiles of the most important indicators ending on the selected day. Cell analyser offers versatile information about the parameters, key performance indicators, consistencies and alarms for analysing a single BTS.

- Base station site check (221)

  This report allows you to make a quick health check of all cells under the selected BCF. It displays a set of KPIs together with information on alarms, configuration and the administrative state.

- Cell doctor (213)

  This report is used to see the details of a BTS on a periodical basis for all counters and also the alarms and parameters across the selected period.

- Availability per BSC unit (215)

  This report shows for each unit of each BSC the total disconnection time and the total number of restarts over a given period of time.

- SDCCH, TCH and BSC out HO observation statistics (217)

  Depending on the dominating failure class (e.g. Abis) it may be necessary to set the cell under observation. With this report, the observation data can be quickly analysed. This report helps to see the actual point of the failure in the message flow as defined by phase and cause.

- Drop call trace (225)

  You can use this report to analyse the data related to the drops of a particular cell. This report pulls together all drops related to the selected cell and gives both an overview and detailed information.

5 Actions to take before using the reports

Before the reports can give reliable and comparable results, you have to check Nokia NetAct for some basic things.

5.1 Checking the PLMN object

Start with checking which PLMN object name and instance you use in the BSS Network Doctor reports.

5.1.1 PLMN object name

The PLMN object name is used in the BSS Network Doctor report headers. In the Nokia NetAct database there may be more than two PLMN objects. BSS Network Doctor is not protected against this and so may show the name of another PLMN. To fix this, just rename both PLMN objects using Network Editor. Note that you need system administrator’s rights to run Network Editor.

5.1.2 PLMN object instance

A PLMN object instance may be defined as a character string, for example, ’PLMN’. This could be fatal to some BSS Network Doctor reports, resulting in the error \xb2 invalid number\xb2 . To fix this, use Network Editor to give the PLMN object instance a numeric value.

5.2 Checking a BTS object instance

Normally a BTS object instance is identified by a number (1...128). A BSC accepts only numbers for the BTS object instance.

In Nokia NetAct, however, it is possible to give a character string for the BTS object instance (foreign cells often have the CI and LAC separated by a space as the identification code) and it does not cause any error if not sent to the network.

However, for some of the BSS Network Doctor reports this feature is fatal, resulting in the error \xb2 invalid number\xb2 . To fix this problem:

1. Delete the BTS with characters in the object instance

   or

2. Change the object instance ID to a number. This is possible only in SQL*Plus and should be done by the system administrator only

   or

3. Set up the maintenance regions so that the odd BTS identification codes are isolated into their own group or MR.

5.3 Estimating the load on Nokia NetAct

This section contains the following topics:

- load on Nokia NetAct
- active measurements in BSCs
- measurement flow from a BSC

5.3.1 Load on Nokia NetAct

This section gives you some basic information on how you should use the measurements to fully benefit from the data the reports provide.

Note

The load caused by receiving measurements and by inserting them in the database can be considerable and can affect the proper functioning of Nokia NetAct.

Experience from the field has shown that there is no forcing need to use the 15 min or 30 min reporting intervals. The 60 min interval in the network analysis is sufficient for practical needs.

If the operator chooses to use the 15 min period, it should be clearly understood that this solution requires four times more capacity than the 60 min period does. There should always be a very good reason behind the decision to go for 15 min or 30 min periods.

The BSS Network Doctor reporting package is designed to work on the 60 min or longer reporting intervals. If a shorter than the 60 min period is used, some reports do not show correct values.

Note

A precise way to calculate how much data a measurement set will produce is to use the *Nokia NMS Excel spreadsheet*. The spreadsheet gives the amount of data but not the load on Nokia NetAct. This is why the tool is applicable if the measurement set is going to be changed and you want to see what is the net impact on the overall data volume.

5.3.2 Active measurements in the BSC

BSS Network Doctor provides a variety of reports for investigating the active measurements in a BSC.

5.3.2.1 How to check what measurements send data to the database

To check which measurements really are active you have to analyse the PM tables to see what measurements have sent data. To do this, use the report **Last BSS measurement record times** (127).

```
===============================================================================
=
=                   LAST BSS MEASUREMENT RECORD TIMES
=
=                   Network:            PLMN
=
===============================================================================

This report shows the date and time of last records available in NetAct
for each measurement type.

Once you have identified a measurement that needs further study you may
user report 121 to find out from where the measurement data has been received.

===============================================================================


. BSC level
.    Availability (of units) ..............p_nbsc_avail   2003_01-24 00:00
.    Load .................................p_nbsc_load    2003_01-24 12:00
.    Clear codes ...........................p_nbsc_cc     2003_01-24 12:00
.    Clear codes PM .......................p_nbsc_cc_pm   2003_01-24 12:00
.    OSI 1 ................................p_nbsc_osi1    no records
.    OSI 2 ................................p_nbsc_osi2    no records
.    OSI 3 ................................p_nbsc_osi3    no records
.    OSI 4 ................................p_nbsc_osi4    no records
.    TRX availability .................p_nbsc_trx_avail   2003_01-24 00:00

. BSC / Abis pool level
.    Reversed Hunting (S10).....p_nbsc_reversed_hunting   no records       *
.    Dynamic Abis (S10).............p_nbsc_dynamic_abis   2003_01-21 21:00 *

. BTS level
.    Traffic ...........................p_nbsc_traffic   2003_01-24 18:00
```

```
.    Resource availability ...........p_nbsc_res_avail   2003_01-24 18:00
.    Handover ..............................p_nbsc_ho    2003_01-24 17:00
.    Undefined adj. cell.........p_nbsc_undef_adj_cell   2003_01-21 00:00
.    Link balance .................p_nbsc_link_balance   2003_01-24 12:00 *
.    Timing advance ..............p_nbsc_timing_advanc   2003_01-24 09:00 *
.    SERLEV ........................p_nbsc_service       2003_01-24 17:00
.    MS Speed ........................p_nbsc_ms_speed    2003_01-24 17:00 *
.    Dual Band ......................p_nbsc_dual_band    2003_01-24 17:00 *
.    C/I Ratio .......................p_nbsc_ci_ratio    no records       *
.    HSCSD (S7).................p_nbsc_high_speed_data   2003_01-24 16:00 *
.    Channel finder (S9).........p_nbsc_channel_finder   2003_01-24 17:00 *
.    MS capability (S9)...........p_nbsc_ms_capability   2003_01-24 17:00 *
.    PCU (S9)...............p_nbsc_packet_control_unit   2003_01-24 17:00
.    Position Based Services (S10)..........p_nbsc_pbs   2003_01-24 17:15 *
.    Non-BCCH Layer Offs(S10)p_nbsc_non_bcch_layer_offs  no records       *
.    PBCCH availability (S10).......p_nbsc_pbcch_avail   2003_01-24 17:00 *
.    Coding scheme (S10) .........p_nbsc_coding_scheme   2003_01-21 17:00 *

. Segment level
.    QoS (S10) ...........................p_nbsc_qos     2003_01-24 17:00 *

. TRX level
.    Resource access ................p_nbsc_res_access   2003_01-24 17:15
.    Power control.......................p_nbsc_power    2003_01-24 18:00
.    Rx quality .......................p_nbsc_rx_qual    2003_01-24 17:00 *
.    Rx level statistics ..........p_nbsc_rx_statistics  2003_01-24 09:00 *
.    Underlay-overlay .................p_nbsc_underlay   2003_01-24 12:00 *
.    Hot Spot .........................p_nbsc_hot_spot   no records       *
.    RLC blocks per TRX (S9)..p_nbsc_rlc_blocks_per_trx  2003_01-24 17:00 *
.    Frame Erasure Rate (S10)...............p_nbsc_fer   2003_01-24 12:00 *

. Adjacency level
.    HO adj. cell ......................p_nbsc_ho_adj    2003_01-23 17:00 *
.    Defined Adjacent Cell (S10)....p_nbsc_def_adj_cell  no records       *
.    UTRAN HO adj.cell (S10.5) p_nbsc_utran_ho_adj_cell  no records       *
.    UTRAN ncell (S10.5)...p_nbsc_utran_ncell_sig_level  no records       *

. Transmission object level
.    DMR ..................................p_nbsc_dmr     2003_01-23 00:00
.    DN2 ..................................p_nbsc_dn2     2003_01-24 00:00
.    TRU ..............................p_nbsc_tru_bie     2003_01-24 00:00
.    ET_BSC (S7)........................p_nbsc_et_bsc    2003_01-24 15:00
.    ET_TCSM (S7).......................p_nbsc_et_tcsm   2003_01-24 15:00
.    TRE (S8)..............................p_nbsc_tre     2003_01-24 00:00
.    TRE_SEL (S8).......................p_nbsc_tre_sel   2003_01-24 00:00

. Bearer channel between PCU and SGSN
.    Frame relay (S9) ..............p_nbsc_frame_relay   2003_01-24 17:00


*) Optional BSC feature
```

Figure 10.   Report 127: Last BSS measurement record times

In the **Records for a measurement type, over BSC** (126) report the number of records, minimum reporting period and maximum reporting period are reported for every hour having measurement results for the selected measurement type.

```
Day      Hour    Min   Max
yyyymmdd hh:mm   prd   prd     RECORD
-------- ----- ----- ----- ----------
19980506 19:05    60    60         12
         20:05    60    60         12
```

```
         21:05    60    60          12
         22:05    60    60          12
         23:05    60    60          12
19980507 00:05    60    60          12
         01:05    60    60          12
         02:05    60    60          12
         03:05    60    60          12
         04:05    60    60          12
         05:05    60    60          12
         06:05    60    60          12
         07:05    60    60          12
         08:05    60    60          12
         09:05    60    60          12
         10:05    60    60          12
         11:05    60    60          12
         12:05    60    60          12
         13:05    60    60          12
         14:05    60    60          12
         15:05    60    60          12
         16:05    60    60          12
         17:05    60    60          12
         18:05    60    60          12
         19:05    60    60          12
         20:05    60    60          12
         21:05    60    60          12
         22:05    60    60          12
         23:05    60    60          12
```

Figure 11. Report 126: Records for a measurement type, over BSC

5.3.2.2 How to see which BSCs send data to the database

To see which BSCs really send data to the database, use the report **First and last measurement record times for each BSC** (121).

In this report you have to select the measurement type. Normally you may use the traffic measurement.

```
===============================================================================
=
=                    FIRST AND LAST BSS MEASUREMENT RECORD TIMES FOR EACH BSC
=
=                    Network:            PLMN
=                    Table selection:            21
=
===============================================================================

This report shows by BSCs the date and time of the first and last records
available in the Nokia NetAct database for the selected measurement type.

First record (start time)  Start time of the first measurement record.
Last record (start time)   Start time of the last measurement record.
Period duration max.       Maximum of period durations.
Period duration min.       Minimum of period durations.

For checking more details about the stored records run report 122
or report 126.

Note: Depending on the selected table, the run time can be long.

===============================================================================
```

```
               Records  in Resource access ( p_nbsc_res_access )

                                                          Period   Period
                     First record      Last record      duration duration
BSC name             (start time)      (start time)         max.     min.
-------------------- ----------------- ----------------- -------- --------
BSC MERKURIUS        2000-10-23 15:00  2000-11-12 09:00        60       60
BSC1KUTOJA           2000-10-23 15:00  2000-11-12 09:00        60       60
BSC2UPS1             2000-10-25 10:00  2000-11-12 09:00        60       60
BSC3TRE              2000-10-23 15:00  2000-11-12 09:00        60       60
BSC4TRE              2000-10-23 15:00  2000-11-12 00:00        60       60
BSC7SALO             2000-10-23 15:00  2000-11-12 09:00        60       60
```

Figure 12. Report 121: First and last measurement record times for each BSC

5.3.2.3 How to set the measurements

The basic measurements (traffic, resource availability, resource access, handover, power control) should:

- be run every day for 24 hours (or, for example, from 05 to 24 h if the operator agrees)
- use the 60 min reporting interval.

With other measurements, use a longer period, 12 hours for example, as needed and as is reasonable in terms of the capacity of Nokia NetAct. Remember that even though it is easy to change the measurement period, you will always lose the data from the period during which you stop the measurement (the period can be changed only when the measurement is stopped).

The BSS measurements used in the BSS Network Doctor reports are the following:

Table 5. BSS measurements

Measurement type `Database table` **Remark**	**Object resolution** **- in starting** **- in reporting**	**Availability** **Nokia NetAct/BSC release**
Traffic `p_nbsc_traffic` Records generated for every measurement period.	- BSC - cell	standard T1/S1 ->
Resource availability `p_nbsc_res_avail` Records generated for every measurement period.	- BSC - cell	standard T1/S1 ->
Resource access `p_nbsc_res_access` Records generated for every measurement period if accesses.	- BSC - TRX	standard T1/S1 ->
Handover `p_nbsc_ho` Records generated only for cells having handovers.	- BSC - cell	standard T1/S1 ->
Power control `p_nbsc_power` 0 values in many counters during the periods without events.	- BSC - TRX (since S6)	standard T1/S1 ->
Load `p_nbsc_load` Records generated for every measurement period.	- BSC - BSC/ processor unit	standard T1/S1 ->
Availability `p_nbsc_avail` Records generated for every measurement period.	- BSC - BSC/ processor unit	standard T1/S1 ->
*Undefined adjacent cell (** `p_nbsc_undef_adj_cell`	- BSC - cell / non-adjacent frequency	standard T3/S2 ->

Table 5. BSS measurements (Continued)

Measurement type `Database table` **Remark**	**Object resolution** **- in starting** **- in reporting**	**Availability** **Nokia NetAct/BSC release**
RX quality `p_nbsc_rx_qual` Records generated only for TRX having TCH call samples.	- BSC - TRX	optional T4/S3 ->
Handover adjacent cell `p_nbsc_ho_adj` Records generated for every measurement period if HOs. All handovers are counted (SDCCH-SDCCH, SDCCH-TCH or TCH-TCH).	- BSC - adjacency	optional T4/S3 ->
Clear codes `p_nbsc_cc` Records generated for every measurement period if traffic.	- BSC - BSC	standard T3/S2 ->
BSC clear codes `p_nbsc_cc_pm` Records generated for every measurement period if traffic.	- BSC - BSC	standard T4/S3 ->
Underlay-overlay statistics `p_nbsc_underlay` Records generated for every measurement period.	- BSC - TRX	optional T6/S4 ->
RX-level statistics `p_nbsc_rx_statistics` Records generated only for TRX having TCH call samples.	- BSC - TRX	optional T6/S4 ->
Link balance per classmark `p_nbsc_link_balance`	- BSC - BTS	optional T6/S4 ->
Timing advance `p_nbsc_timing_advance` 0 and -1 values in many counters during the periods without MS power measurements.	- BSC - BTS	optional T6/S4 ->

Table 5. BSS measurements (Continued)

Measurement type `Database table` **Remark**	**Object resolution** **- in starting** **- in reporting**	**Availability** **Nokia NetAct/BSC release**
Resource availability per BSC `p_nbsc_trx_avail` Records generated for every measurement period.	- BSC - BSC	standard T6/S4 ->
BSC clear code `p_nbsc_service` Records generated for every measurement period if traffic.	- BSC - BTS	standard T6/S4 ->
MS speed `p_nbsc_ms_speed` Records generated for every measurement period if traffic. BTS DF3 of B10 is needed.	- BSC - BTS	optional T10/S6 ->
Dual band `p_nbsc_dual_band`	- BSC - BTS	optional T10/S6 ->
C/I ratio `p_nbsc_ci_ratio`	- BSC - BTS	optional T10/S6 ->
Hot spot `p_nbsc_hot_spot`	- BSC - TRX	optional T10/S6 ->
DMR `p_nbsc_dmr` Records generated for every measurement period. Missing data possible for individual units in Nokia NetAct if remote operation cleared measurement in the unit.	- BSC - DMR	standard T10/S6 ->
DN2 `p_nbsc_dn2` See DMR.	- BSC - DN2 port	standard T10/S6 ->
TRU `p_nbsc_tru_bie` See DMR.	- BSC - TRU direction	standard T10/S6 ->
ET_BSC `p_nbsc_et_bsc`	- BSC - ET	standard T11/S7 ->

Table 5. BSS measurements (Continued)

Measurement type **`Database table`** **Remark**	**Object resolution** **- in starting** **- in reporting**	**Availability** **Nokia NetAct/BSC release**
ET_TCSM `p_nbsc_et_tscm`	- TCSM - ET	standard T11/S7 ->
High speed data `p_nbsc_high_speed_data`	- BSC - BTS	optional T10/S6 ->
TRE `p_nbsc_tre`	- BSC - Q1 object	standard T11/S8 ->
TRE_SEL `p_nbsc_tre_sel`	- BSC - Q1 object	standard T11/S8 ->
Channel Finder `p_nbsc_channel_finder`	- BSC - BTS	standard T12/S9 ->
MS capability `p_nbsc_ms_capability`	- BSC - BTS	standard T12/S9 ->
Packet Control Unit `p_nbsc_packet_control_unit`	- BSC - BTS	standard T12/S9 ->
RLC Blocks per TRX `p_nbsc_rlc_blocks_per_trx`	- BSC - TRX	standard T12/S9 ->
Frame relay `p_nbsc_frame_relay`	- BSC - Bearer channel	standard T12/S9 ->
Defined adjacent cell `p_nbsc_def_adj_cell`	- BSC - adjacency	optional T12/S10 ->
Dynamic Abis `p_nbsc_dynamic_abis`	- BSC - Abis pool	optional T12/S10 ->
Frame erasure rate `p_nbsc_fer` Records generated only for TRXs having TCH call samples	- BSC - TRX	optional T12/S10 ->
Position based services `p_nbsc_pbs`	- BSC - BTS	optional T12/S10 ->
Coding scheme `p_nbsc_coding_scheme`	- BSC - BTS	optional T12/S10 ->

Table 5. BSS measurements (Continued)

Measurement type `Database table` **Remark**	**Object resolution** **- in starting** **- in reporting**	**Availability** **Nokia NetAct/BSC release**
Reversed hunting `p_nbsc_reversed_hunting`	- BSC - Abis pool	optional T12/S10 ->
Quality of service `p_nbsc_qos`	- BSC - Segment	optional T12/S10 ->
PBCCH availability `p_nbsc_pbcch_avail`	- BSC - BTS	optional T12/S10 ->
Non-BCCH layer offset `p_nbsc_non_bcch_layer_offs`	- BSC - BTS	optional T12/S10 ->
UTRAN handover adjacent cell `p_nbsc_utran_ho_adj_cell`	- BSC - adjacency	optional OSS3.1 ED2/S10.5 ->
UTRAN neighbouring cell signal level `p_nbsc_utran_ho_adj_cell`	- BSC - adjacency	optional OSS3.1 ED2/S10.5 ->

Note

Measurements that are optional BSC features must be activated by BSC MML before they can be set and started from Nokia NetAct. For example, to activate Rx Quality/ HO Adjacent Cell, give command `ZWOF:10-28:1;`.

*) If other than the neighbouring cell frequency is measured, you have to set on not only the measurement but to create a BCCH allocation list in the BSC and the BTSs assigned to it.

The Undefined Adjacent Cell measurement as such may be active but it reports only the neighbouring cell frequencies with strange base station identity codes until the BTSs have been assigned to a BAL. Once it is assigned to a BAL, all frequencies of a BAL are reported.

The BAL assignment should not be used globally in the network. Only one well-defined small area (group of BTSs) at a time should be defined to use a BAL in BTSs. This is because the usage of a BAL loads MSs. In general the undefined adjacent cell measurement also produces a lot of data to Nokia NetAct. Also, typically there are not enough people to analyse the result for larger areas. Be careful with the usage of BALs and undefined adjacent cell measurement.

In practice, the use of a double BAL is possible if there are not many frequencies in the network (less than 32 - for example, in GSM networks this is possible). If there are many frequencies as in a DCS network, then the double BAL is not applicable for this purpose.

5.3.3 Measurement flow from a BSC

To check that the measurement flow from the BSCs is functioning, use the report **Records for a measurement type, over BTS area** (122).

```
===============================================================================
=
=                    RECORDS FOR A MEASUREMENT TYPE, OVER BTS AREA
=
=                    Network:            PLMN
=                    Area:               All BTSs selected
=                    Measurement name:   HSCSD
=                    Measurement table:  p_nbsc_high_speed_data
=
===============================================================================

This report shows the number of records, minimum reporting period and maximum
reporting period for every hour having measurement results for the
selected measurement type. The hour and minutes shown is the beginning time of
the measurement period.

Note: Running this report takes a while. Patience please.

===============================================================================

                  Min   Max
Day      Hour     prd   prd
yyyymmdd hh:mm  (min)  (min)    RECORDS
-------- -----  -----  -----  ----------
19990826 10:00     60     60           4
         11:00     60     60           2
         13:00     60     60           1
         14:00     60     60           1
         15:00     60     60           1
         16:00     60     60           1
         17:00     60     60           3
         18:00     60     60           1
```

Figure 13. Report 122: Records for a measurement type, over BTS area

If the 60 min period is used and the number of records for a measurement period differs from the number of BTSs in the area which has active measurements, the system administrator should be alerted to check why the measurements are not transferred. Note that if traffic is very low, some measurements, such as handover, do not generate any records for those measurement periods in which no handovers have occurred.

A BSC can buffer measurements and alarms for several hours, if the links between Nokia NetAct and the BSC are down, but the situation should be corrected as soon as possible to avoid an emergency later.

5.4 Checking observations

The **TCH and SDCCH observation records** (124) report shows all BTSs and TRXs per observation type that have records in the database.

Note that this situation is seen from the Nokia NetAct database. There could be cases when the observation is active in BSC even though Nokia NetAct sees it as inactive. To be sure about the measurement status, read them from the network and check them against the MML output.

The observations may produce a huge amount of data and are therefore a very critical property as regards the load on Nokia NetAct. Use the observations only when needed for troubleshooting and remember to stop them.

```
================================================================================
=
=                   TCH AND SDCCH OBSERVATIONS RECORDS
=
=                   Network:            PLMN
=                   Period:             from   19991114 to   19991116
=
================================================================================

This report shows all BTSs/TRXs per obsevation type having records
in the Nokia NetAct database.


================================================================================



SDCCH observation records are available for:

                                                       Last
                                                Nbr of records
BSC           BCF             BTS               records yyyy-mm-dd hh
------------- --------------- --------------- ------- --------------------
BSC1KUTOJA    KILO007         KILO1011              2 1999-11-16 10
BSC1KUTOJA    KUTOJA001       KUTOJA1002          120 1999-11-16 13
BSC4TRE       1800_3Ail       7HERMIA3A             1 1999-11-15 14
BSC4TRE       1800_3Ail       8HERMIA3A             2 1999-11-15 14
BSC4TRE       1900_3Ail       10HERMIA3A           71 1999-11-16 10
BSC4TRE       1900_3Ail       11HERMIA3A           96 1999-11-16 11
BSC4TRE       1900_3Ail       12HERMIA3A           71 1999-11-16 10
BSC4TRE       EGSM_3Cil       40HERMIA3CIVHUO       2 1999-11-15 11
BSC4TRE       EGSM_3Cil       42HERMIA3CIVHUO       1 1999-11-15 11
BSC4TRE       EGSM_Leo        18LEONIA              2 1999-11-15 12

TCH observation records are available for:

                                                           Last
                                                    Nbr of records
BSC           BCF             BTS               TSL records yyyy-mm-dd hh
------------- --------------- --------------- --- ------- --------------------
BSC1KUTOJA    KILO007         KILO1011          1       1 1999-11-16 10
BSC1KUTOJA    KILO007         KILO1012          6       1 1999-11-16 10
BSC4TRE       1800_3Ail       8HERMIA3A         3       1 1999-11-15 14
```

Figure 14. Report 124: TCH and SDCCH observation records

5.5 Checking blocked or filtered alarms

In order to follow the alarm situation in the network, it is essential that all alarms are sent to Nokia NetAct.

You can block the alarms in the DX 200 network elements (BSC, MSC, HLR, Nokia NetAct FE) with MML. The information on which alarms are blocked is not stored in the Nokia NetAct database.

You should check periodically which alarms are blocked in the network elements by using a remote MML and by verifying the situation against the alarm and blocking filtering plan.

In the Nokia NetAct Framework release there is a feature called Alarm Filtering and Acknowledging. This feature allows you to discard, for example, the alarms from the BTSs which are not yet in the operational state but in integration and testing. The usage of the feature needs to be under good control so that the alarms are not filtered out any longer than is necessary.

5.6 Checking the maintenance region assignments

5.6.1 Using maintenance regions for reporting

Maintenance region (MR) is an internal concept of Nokia NetAct. The Maintenance region itself is created in the Nokia NetAct database as an object under the PLMN object using Network Editor. When other objects are created in the Nokia NetAct database using Network Editor, it is possible to assign each object to one and only one of the existing maintenance regions.

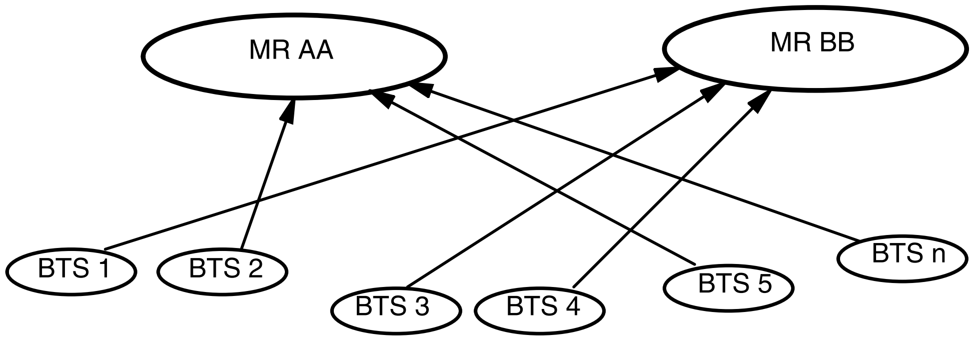

Figure 15. Assignment of objects to a maintenance region.

It is a good idea to have a separate MR for those BTSs which are not yet integrated, as then the integrated BTS may belong to the same MR or one of various other MRs (for example, a MR per town) and it is easy to generate reports which are not disturbed by tasks related to installation and integration. This works particularly well in the pre-launch phase.

5.6.2 Common mistakes

It often happens that in the beginning of network operations, the division of the network into maintenance regions is not well planned and all objects are assigned to one and the same MR, or are not assigned to any MR. Later, when the network grows and reporting practices are created, you may find that a MR can be effectively used for creating separate reports for various parts of the network. You can use Network Editor to create the MR assignments of objects.

5.6.3 How to see the MR division

To see how the MRs are used, run the report **Network configuration summary** (090).

```
================================================================================
=
=                   NETWORK CONFIGURATION SUMMARY
=
=                   Network:            PLMN
=
================================================================================

This report shows statistics about the capacity of the network

- NSS, DX220, SMSC, VMS network entity sums for each MR and total sum.

- BSS network entity sums for each MR and sum over the network.

- BTS sums for each MR and sum over the network per band.

- BSS network entity sums for each MR and sum over the network in sorted out
. by the number of BTSs, for used and not used BCFs, BTSs, TRXs and CHNs
.  BSC TOT: total nbr of BSCs
.  TC TOT : total nbr of transcoders
.  PCM TOT: total nbr of PCMs
.  BCF UNL: nbr of unlocked BCFs
.      LCK: nbr of locked BCFs
.  BTS
.      USD: nbr of used BTSs (BTS and BCF unlocked)
.      NUS: nbr of non-used BTSs (BTS or BCF locked)
.  TRX
.      USD: nbr of used TRXs (TRX, BTS and BCF unlocked)
.      NUS: nbr of non-used TRXs (TRX or BTS or BCF locked)
.  CHN
.      USD: nbr of used Channels (CHN, TRX, BTS and BCF unlocked)
.      NUS: nbr of non-used Channels (CHN or TRX or BTS or BCF locked)
.  ADJ TOT: total nbr of adjacencies

- BSS network entity sums for each MR and sum over network sorted out
. by the number of BTSs, for locked and unlocked BCFs, BTSs, TRXs and CHNs
.  BCF UNL: nbr of unlocked BCFs
.      LCK: nbr of locked BCFs
.  BTS UNL: nbr of unlocked BTSs
```

.   LCK: nbr of locked BTSs
. TRX UNL: nbr of unlocked TRXs
.   LCK: nbr of locked TRXs
. CHN UNL: nbr of unlocked Channels of TRX (includes signalling chns)
.   LCK: nbr of locked Channels

- Transmission element sums for each MR and sum over the network
. DMR TOT: total nbr of DMRs
. DN2 TOT: total nbr of DN2s
. TRU TOT: total nbr of TRUs
. TCSM TOT: total nbr of TCSMs

- Averages of entities per higher object (used CHN,TRX,BTS counts applied)

- Statistics on used channel types

NOTE: Foreign BCF and underlying objects are filtered out.
NOTE: Running this report takes a while. Patience please.

===
-

OMC, NSS, DX, SMS, VMS, SGSN, GGSN, CG NE Summaries per Maintenance Region
(Only objects existing in the network counted)

Maint. Region	OMC tot	OMC FE tot	OMC WS tot	HLR tot	MSC tot	Dx220 tot	VMS tot	SMSC tot	GGSN tot	SGSN tot	CG tot
non assign											
GSM1800	1		4	1	1			1			
globalScope											
Unknown											
ESPOO										1	
TAMPERE											
TELEKARA											
SALO											
sum	1			1	1			1		1	

BSS Network Entity Summaries per Maintenance Region

Maint. Region	TC tot	BSC tot	PCM tot	BCF usd	BCF nus	BTS usd	BTS nus	TRX usd	TRX nus	CHN usd	CHN nus	ADJ tot in nw
non assign		2								1168	560	25
globalScope												
Unknown												
TELEKARA		1	33	33	8	37	18	57	29			58
SALO		1	7	8	1	24	2	41	10			190
GSM1800			11	8	1	23	4	36	15		40	174
TAMPERE		2	21	3		5		14			32	15
ESPOO		2	17	6	1	3	1	4	1			13
sum		8	89	58	11	92	25	152	55	1168	632	475

usd = used (object and all abovestanding objects are unlocked)
nus = not used (object or any abovestanding object(s) is locked)

```
--------------------------------------------------------------------------------
              BSS Network Entity Summaries per Maintenance Region
                            Number of BTSs per Band
--------------------------------------------------------------------------------

              Nbr of BTS Nbr of BTS Nbr of BTS
Maint. Region     GSM900    GSM1800    GSM1900
------------- ---------- ---------- ----------
ESPOO                  2          9          0
GSM1800                2         28          0
SALO                  15         11          0
TAMPERE               23         16          4
TELEKARA               2         63          0
Unknown
globalScope
non assign
              ---------- ---------- ----------
sum                   44        127          4


--------------------------------------------------------------------------------
              BSS Network Entity Summaries per Maintenance Region,
             Directly Locked and Unlocked BCF, BTS, TRX, CHN counts
--------------------------------------------------------------------------------

                BCF        BTS        TRX          CHN
Maint. Region   unl  lck   unl  lck   unl  lck     unl  lck
------------- ----- ---- ----- ---- ----- ---- ------ ----
non assign                                        1608
globalScope
Unknown
TAMPERE           3          5         14
ESPOO             6    1     4          4
TELEKARA         33    8    40   15    65   18
GSM1800           8    1    25    2    38   11
SALO              8    1    24    2    44    7
              ----- ---- ----- ---- ----- ---- ------ ----
sum              58   11    98   19   165   36   1608


Note: These counts do not take into consideration the state of the abovestanding
objects.


--------------------------------------------------------------------------------
             Transmission Element Summaries per Maintenance Region
--------------------------------------------------------------------------------

               DMR  DN2  TRU TCSM
Maint. Region  tot  tot  tot  tot
------------- ---- ---- ---- ----
non assign                14
GSM1800          8    4   10
globalScope
Unknown
ESPOO            7    3    1    4
TAMPERE                   10    4
TELEKARA         8    1    3    2
SALO                       8    2
              ---- ---- ---- ----
sum             23    8   46   12



--------------------------------------------------------------------------------
```

```
               BSS Network Entity Averages per Maintenance Region
--------------------------------------------------------------------------------

              avg    avg   avg    avg    avg     avg    avg     avg  avg
              PCM    TC    BCF    BTS    TRX     BTS    TRX     TRX  ADJ
              per    per   per    per    per     per    per     per  per
Maint. Region BSC    BSC   BSC    BSC    BSC     BCF    BCF     BTS  BTS
------------- ------ ----- ------ ------ ------- ------ ------- ---- --------
GSM1800                                             3.0     5.7  1.9      6.4
globalScope                                       --     --      --   --
Unknown                                           --     --      --   --
TELEKARA        33.0         41.0   55.0    86.0    1.3     2.1  1.6      1.1
SALO             7.0          9.0   26.0    51.0    2.9     5.7  2.0      7.3
TAMPERE         10.5          1.5    2.5     7.0    1.7     4.7  2.8      3.0
ESPOO            8.5          3.5    2.0     2.5    0.6     0.7  1.3      3.3
non assign                    0.0    0.0     0.0  --     --      --   --


Note: Only those objects are counted which are in use.

-

--------------------------------------------------------------------------------
     Channel statistics for channels which are in use in whole network, i.e.
      which are unlocked and above standing TRX, BTS and BCF are unlocked.
--------------------------------------------------------------------------------

Channel  Channel
type       count
-------- -------
MBCCB         34
MBCCH          9
MBCCHC        49
SDCCB         45
SDCCH         18
TCHD         289
TCHF         723
TCHH           1
```

Figure 16. Report 090: Network configuration summary

5.6.4 How to find errors in assignments

To find errors, you can verify that all objects under a BSC belong to the same MR as the BSC itself by running the report **Maintenance region audit** (064). The report shows you all deviations from this rule.

Note that in some BSCs the rule may not be valid - the operator wants to organise the BSs under one BSC to different MRs. Also, often there is a 'Foreign BSC' which does not belong to any MR. This BSC is just a virtual BSC which is needed for handling the foreign BTSs that are needed to handle adjacencies to cells in another OMC (other vendor's OMC or another Nokia NetAct).

An easy way to see how the BSC-BCF-BTS objects are assigned to MRs is to run the report **All radio network sorted out by BSC, BCF, BTS** (042).

5.7 Setting the history windows

The size of the Nokia NetAct database is limited by the size of the available disk space, and you must compromise when deciding which information is worth storing the longest.

For setting up the history window in Nokia NetAct, consult your system administrator for creating an appropriate 'do-delete.sql' script and adding that to Cron job.

The following table gives you an idea about storing lengths which have proven practical.

Table 6. Example of history windows in the Nokia NetAct database

Type of data	Storing period
Measurements	10 days In reports like **Cells having UL interference, 24-hour/10-day breakdowns** (190) it is necessary to see more than one week's data in order to find out the repetition patterns.
Observations	3 days The observations are typically used for troubleshooting and do not need a long history.
As any user	The results are not used much because they do not contain the most interesting counters.
Alarms	10 days Mostly the alarm information is used on the spot but in some troubleshooting cases even a period of several weeks may prove useful. In the Nokia NetAct Framework release the feature PM Thresholds allows you to generate alarms based on counters and these may be interesting to analyse.

For long-term storage, Nokia NetAct provides the Network Data Warehouse product.

6 Consistency checks

The Nokia NetAct database contains a lot of data which has to be consistent. If you use Nokia NetAct Top-level User Interface, the consistency needs to be checked in some cases. Discrepancies may occur in the following cases:

- Changes made using remote MML

  The Top-level User Interface may sometimes prove slow for making major changes in the network. Therefore you can use a remote MML to make big changes in the network configuration and a PC to run command files in the network elements. In fact, the PC is used as a service terminal and it also uses MML. In those situations, the BSC may not succeed in updating all the changes to the Nokia NetAct database reliably.

- *Errors in the radio network plan*

  Sometimes the radio network plan itself includes discrepancies.

- *Errors in data insertion into the database*

  Sometimes errors are accidentally caused when inserting the data.

Before you run the check on the reports, it is a good idea to upload radio network data from the network to make sure that the Nokia NetAct database matches the situation in the network. In a large network, uploading takes quite a long time but if there is a suitable view containing all BTS sites, it can initiated for the whole network, and the task runs automatically.

BSS Network Doctor supports the following types of checks:

- Adjacencies to non-existing cells
- Adjacency discrepancies
- Non-symmetrical adjacencies
- Same or adjacent frequencies in the adjacent cells
- Handover synchronisation between adjacent cells
- Adjacent cell double frequency check
- BTS audit

- Checking the adjacency plan
- Checking the frequency plan
- Checking the administrative states

6.1 Adjacencies

6.1.1 Adjacencies to non-existing cells

Adjacencies may be created for cells which are under another OMC and therefore the cell itself is not found in the database. Sometimes an adjacency linked to a non-existing cell is a mistake. The report for checking this is **Adjacencies to non-existing or foreign cells** (065).

```
===============================================================================

=
=                   ADJACENCIES TO NON-EXISTING OR FOREIGN CELLS
=
=                   Network:            PLMN
=                   Area:               All BTSs selected
=                   Sorting key:        source BSC name, source BTS ID
=
===============================================================================

Normally every adjacency should be towards an existing cell.
In this report all adjacencies are checked so that the adjacent cell
(c_bts:ci, lac) really is found in the Nokia NetAct database in the c_bts table.
Discrepancies are reported.

Instructions:
Remove the incorrect adjacencies by the Top-level User Interface after comparing
the report to the plan.
Note that if the adjacent cell exists in another Nokia NetAct, no correction is
needed.

Note: Running this report takes a few minutes. Patience please.

===============================================================================
                       Adjacencies to non-existing cells

Source          Source                      Source ADJ.CELL ADJ.CELL
BSC (BTS id)    BCF/BTS                 BTS int_id      LAC       CI
--------------- -------------------- ---------- -------- --------
BSC533(48)      BSC533                   118112    22871     1022
                Cid 2413

BSC552(24)                               102679    22870     3291
BSC553(1)                                 97461    22870     3301
BSC553(2)                                 97769    22870     3301
BSC553(4)                                 98375    22870     3301
BSC553(10)                                99316    22870     3142
```

Figure 17. Report 065: Adjacencies to non-existing or foreign cells

Use the Top-level User Interface to remove any unnecessary adjacencies.

6.1.2 Adjacency discrepancies

There are a few parameters of the adjacency object which have to be the same as in the target cell. The report for checking this is **Adjacency discrepancies** (060).

```
=================================================================================
=
=                   ADJACENCY DISCREPANCIES
=
=                   Network:            PLMN
=                   Area:               All BTSs selected
=                   Sorting key:        source BSC name, source BTS ID
=
=================================================================================

This report lists the discrepancies of various parameters between the source
cell adjacency parameters and target cell parameters.

Impact of discrepancies:
Any difference between two identical parameters of the target BTS and
the same parameter of adjacency usually results in handover failures between
the source and the target BTSs.

The first of each pair of lines indicates the adjacency of a source cell.
The second line indicates the target cell.
Parameters in the first line show the values in the adjacency (ADJ) of a source
cell defined in c_adjacent_cell table.
Parameters in the second line (TGT) show the values of the target cell in c_bts
table.

The checked parameters are: Location Area Code (LAC), Cell Identity (CI),
Frequency (FREQ), Maximum power of MS (PMAX), Network Colour Code (NCC) and
Base Station Colour Code (BCC). These should be the same in the adjacency and
in the target cell.

In case there is any kind of discrepancy indicated by the report, do the following:

1) Upload adjacency data from the network for the claimed BTSs.
2) Run this check again.
3) If discrepancies are still found, check and correct them via MML.

================================================================================


                     Adjacency discrepancies in PLMN network

                                                        LAC    CI     FREQ PMAX NCC BCC
                                                        ===    ===    ===  ==== === ===
Source BSC (BTSid) Source BCF/BTS                       ADJ    ADJ    ADJ  ADJ  ADJ ADJ
Target BSC (BTSid) Target BCF/BTS                       TGT    TGT    TGT  TGT  TGT TGT
------------------ ---------------------------- ------ ------ ---- ---- --- ---
BSC1KUTOJA(6)      SUOSAA004 / SUOSAA1006       1      10010  600  30   7   2
BSC1KUTOJA(10)     LAAJAL010 /LAAJAL1010        1      10010  773  30   7   2

BSC1KUTOJA(7)      SUOSAA004 / SUOSAA1007       1      10010  600  30   7   2
BSC1KUTOJA(10)     LAAJAL010 /LAAJAL1010        1      10010  773  30   7   2

BSC1KUTOJA(9)      LAAJAL009 / LAAJAL1009       1      10010  600  30   7   2
BSC1KUTOJA(10)     LAAJAL010 /LAAJAL1010        1      10010  773  30   7   2

BSC1KUTOJA(9)      LAAJAL009 / LAAJAL1009       2      20003  594  30   7   7
BSC2UPS1(3)        3UPS001 /3UPSULTRA2003       2      20003  764  30   7   7
```

```
BSC1KUTOJA(9)      LAAJAL009 / LAAJAL1009        2      20002  600   30    7   7
BSC2UPS1(2)        3UPS001 /3UPSULTRA2002        2      20002  762   30    7   7

BSC1KUTOJA(14)     KILONKALLIO008 / KKALLIO14    2      20001  778   30    7   7
BSC2UPS1(1)        3UPS001 /3UPSULTRA2001        2      20001  776   30    7   7

BSC2UPS1(10)       5KOM005 / 5KOM2010            1      10009  605   30    7   2
BSC1KUTOJA(9)      LAAJAL009 /LAAJAL1009         1      10009  788   30    7   2

BSC3TRE(1)         HATANP001 / HATANP3001        4      415    771   30    7   2
BSC4TRE(15)        1800_Leo /15LEONIA            4      415    769   30    7   4

BSC3TRE(1)         HATANP001 / HATANP3001        4      420    78    33    0   2
BSC4TRE(20)        900_Leo /20LEONIA             4      420    74    33    0   4

BSC3TRE(1)         HATANP001 / HATANP3001        4      418    1015 33     7   4
BSC4TRE(18)        EGSM_Leo /18LEONIA            4      418         33     7   4
                                                               1016
```

Figure 18. Report 060: Adjacency discrepancies

You should also check every discrepancy with MML commands. Use the Top-level User Interface to resend or read the incorrect adjacencies from the network depending on which values are correct.

6.1.3 Non-symmetrical adjacencies

Normally all adjacencies are bidirectional or symmetrical. Non-symmetrical adjacencies are sometimes created by mistake. To find such adjacencies, run the report **Non-symmetrical adjacencies** (061).

```
================================================================================
=
=                    NON-SYMMETRICAL ADJACENCIES
=
=                    Network:            PLMN
=                    Area:               All BTSs selected
=                    Sorting key:        source BSC name, source BTS ID
=
================================================================================

This report shows all missing adjacencies assuming that all adjacencies
should be symmetrical (bidirectional).
The missing adjacencies are sorted by BSCs and cell names.
The Maintenance region is checked for source cells.

Instructions:     The missing adjacencies have to be checked with network
.                 planners.

Running the report may take a moment. Patience please.

================================================================================


                   Nonsymmetrical adjacencies in PLMN network

from cell                                 to cell
cell/bcf name                             cell/bcf name
```

```
   bsc name - bts id (ci,lac)        =x=>    bsc name - bts id (ci,lac)
----------------------------------- ---- ----------------------------------
KUTOJA1002/KUTOJA001                 =x=> /SUOSAA004
  BSC1KUTOJA-2(10002,1)                     BSC1KUTOJA-7(10007,1)

/SUOSAA004                           =x=> KUTOJA1001/KUTOJA001
  BSC1KUTOJA-6(10006,1)                     BSC1KUTOJA-1(10001,1)

/SUOSAA004                           =x=> /SUOSAA004
  BSC1KUTOJA-6(10006,1)                     BSC1KUTOJA-7(10007,1)

KILO1012/KILO007                     =x=> KKALLI1016/KILONKALLIO008
  BSC1KUTOJA-12(10012,1)                    BSC1KUTOJA-16(10016,1)

3UPS2001/3UPS001                     =x=> KKALLI1014/KILONKALLIO008
  BSC2UPS1-1(20001,2)                       BSC1KUTOJA-14(10014,1)

3UPS2002/3UPS001                     =x=> LAAJAL1009/LAAJAL009
  BSC2UPS1-2(20002,2)                       BSC1KUTOJA-9(10009,1)

3UPS2003/3UPS001                     =x=> LAAJAL1009/LAAJAL009
  BSC2UPS1-3(20003,2)                       BSC1KUTOJA-9(10009,1)

1UPS2006/1UPS002                     =x=> KKALLI1014/KILONKALLIO008
  BSC2UPS1-6(20006,2)                       BSC1KUTOJA-14(10014,1)

5KOM2009/5KOM005                     =x=> KKALLI1014/KILONKALLIO008
  BSC2UPS1-9(20009,2)                       BSC1KUTOJA-14(10014,1)

5KOM2009/5KOM005                     =x=> KKALLI1015/KILONKALLIO008
  BSC2UPS1-9(20009,2)                       BSC1KUTOJA-15(10015,1)

5KOM2010/5KOM005                     =x=> KKALLI1014/KILONKALLIO008
  BSC2UPS1-10(20010,2)                      BSC1KUTOJA-14(10014,1)

5KOM2010/5KOM005                     =x=> KKALLI1015/KILONKALLIO008
  BSC2UPS1-10(20010,2)                      BSC1KUTOJA-15(10015,1)

5KOM2010/5KOM005                     =x=> LAAJAL1009/LAAJAL009
  BSC2UPS1-10(20010,2)                      BSC1KUTOJA-9(10009,1)

5KOM2011/5KOM005                     =x=> KKALLI1015/KILONKALLIO008
  BSC2UPS1-11(20011,2)                      BSC1KUTOJA-15(10015,1)

5KOM2011/5KOM005                     =x=> KKALLI1014/KILONKALLIO008
  BSC2UPS1-11(20011,2)                      BSC1KUTOJA-14(10014,1)

MAKKYL2012/MAKKYL006                 =x=> KKALLI1014/KILONKALLIO008
  BSC2UPS1-12(20012,2)                      BSC1KUTOJA-14(10014,1)
```

Figure 19. Report 061: Non-symmetrical adjacencies

6.1.4 Same or adjacent frequencies in adjacent cells

Normally the adjacent cells should not have the same frequency as the source cell, or the adjacent frequency. This is necessary in order to avoid interference. To find any such occurrences, run the report **Frequency check of adjacent cells** (062).

```
===============================================================================
=
=                    FREQUENCY CHECK OF ADJACENT CELLS
=
=                    Network:            PLMN
=                    Area:               Group: XX
=                    Search selection:   only same adjacencies
=                    Sorting key:        source BSC name, source BTS ID
=
===============================================================================

This report displays all adjacencies where a cell and its adjacent cell
have the same frequency (f) or adjacent (f-1 or f+1) frequency.
The maintenance region is checked for source cells.
For each pair of frequencies also the administrative state (S) of objects
(BCF,BTS,TRX) is shown as well as the use of TRX (BCCH or TCH).

Decoding of states (S):
N= No state
U= Unlocked
S= Shutting down
L= Locked

Adjacent cells should never have the same BCCH and BSIC.
Same frequencies should not be used in adjacent cells. Also the f-1 or f+1
situation should be avoided if possible.

Note: If TRX is a BCCH TRX then the output power is maximal all time.

Note: Running this report for a large area takes a while. Patience please.

===============================================================================
                     Adjacency frequency check in the PLMN network


Source                Source            Target                Target
******                ******            ******                ******
(S)TRX_id(use)        BSC               (S)TRX_id(use)        BSC
(S)BTS_name           BTS id (CI,LAC)   (S)BTS_name           BTS id (CI,LAC)
(S)BCF                freq, NCC, BCC    (S)BCF_name           freq, NCC, BCC
--------------------  ----------------  --------------------  ----------------
(U)1(BCCH)            Town X_BSC0       (U)1(BCCH)            Town X_BSC1
(U)Forest site-1      4 (20111,2901)    (U)Site F-1           55 (20381,2902)
(U)Forest site        56,4,5            (U)Site F             56,4,0

(U)1(BCCH)            Town X_BSC0       (U)1(BCCH)            Town X_BSC0
(U)Forest site-1      4 (20111,2901)    (U)West Harbours -1   13 (20151,2901)
(U)Forest site        56,4,5            (U)West Harbours      55,4,4
```

Figure 20.   Report 062: Frequency check of adjacent cells

A similar report, **Frequency check of adjacent cells (IUO super TRX excluded)** (405) is available separately for IUO cells, too.

6.1.5 Handover synchronisation between adjacent cells

Normally all adjacencies between cells in the same BTS site are synchronous for HO and adjacencies between cells in different BTSs should be non-synchronous for HO.

If the adjacent cell is in the same BTS site but is not synchronous, the load on BTS processing is increased because the MS needs to request:

- the BTS timing advance
- power level for the handover.

This is not serious, but can be avoided.

If the adjacent cell is not in the same BTS site but adjacency is synchronous, calls will fail. For handover synchronisation between adjacent cells, run the report **Handover synchronisation** (067).

```
===============================================================================
=                   HANDOVER SYNCHRONISATION
=
=                   Network:            PLMN
=                   Maintenance Region: Ghost Town
=                   BTS group:          group selection bypassed
=                   Sorting key:        source BSC name, source BTS ID
=
===============================================================================


This report lists all adjacencies
- which are in the same BS site but are not synchronous
.  This is serious and may result in call failures and decreases
.  voice quality
- which are not in the same BS site but are synchronous
.  This is serious and can result in call failures

Synchronous HO means that the MS uses the old value of Timing Advance.
Non-synchronous HO means that the MS finds the new value of Timing Advance.
Normally only adjacent cells in the same site are synchronous for HO

Instructions:
You may use GUIMAN CM or BSC MLL (command ZEAM:BTS=xx:LAC=yy,CI=zz:SYNC=aa;)
to correct the error.


===============================================================================

-
          Adjacencies between cells in the same BS but not synchronous

Source          Source          Target          Target          Target
*************** *************** *************** *************** ******
BSC (BTS id)    BCF             BSC (BTS id)    BCF             CI
                BTS                             BTS             LAC    SYN
--------------- --------------- --------------- --------------- ------ ---
BSC111          Phantom st      BSC111          Phantom st      30102  No
(11)            3358            (12)            30102           15000

BSC111          Phantom st      BSC111          Phantom st     3358   No
(12)            30102           (11)            3358            15000
```

```
2 rows selected.

          Adjacencies between cells in the different BS but synchronous

Source          Source          Target          Target          Target
*************** *************** *************** *************** ******
BSC (BTS id)    BCF             BSC (BTS id)    BCF             CI
                BTS                             BTS             LAC    SYN
--------------- --------------- --------------- --------------- ------ ---
BSC14           Spirit st       BSC14           Tomb st         6394   Yes
(26)            6260            (27)            6394            2000

BSC14           Tomb st         BSC14           Spirit st       6260   Yes
(27)            6394            (26)            6260            2000

BSC15           Graveyard st 1  BSC15           Graveyard st 2  6289   Yes
(64)            6282            (65)            6289            1700
```

Figure 21. Report 067: Handover synchronisation

To correct the error, open an MML session to the BSC in question and enter:

```
ZEAM:BTS=xx:LAC=yy,CI=zz:SYNC=aa;
```

6.1.6 Adjacent cell double frequency check

If two cells are neighbours of one and the same cell, they are obviously not located far from each other. If these cells have the same frequency, interference may occur. To see if there are any such incidents, run the report **Adjacent cell double frequencies** (069).

```
===============================================================================

=
=                  ADJACENT CELL DOUBLE FREQUENCIES
=                  Network:            PLMN
=                  Maintenance Region: All MRs
=                  BTS group:          Test cells
=
===============================================================================


This report lists all cells having adjacent cells with the same
frequency. This is a potential source of interference.

Note: Every occurrence is listed twice.

Input parameters: BTS area

Instructions:     The reported pairs of target cells have to be checked
.                 with network planners.

Running the report takes a moment. Patience please.

===============================================================================
```

```
                                    Target1             Target2
Source        Source                BSC (BTS id)        BSC (BTS id)
BSC           BCF                   BCF                 BCF
(BTS id)      BTS                   BTS                 BTS                 Freq
------------  ----------------  ------------------  ------------------  -----
BSC53         Cave hill             BSC53(41)           BSC53(10)            105
(47)          1100                  Harbour             Gardens
                                    3104                1187

BSC53         Cave hill             BSC53(10)           BSC53(41)            105
(47)          1100                  Gardens             Harbour
                                    1187                3104
```

Figure 22. Report 069: Adjacent cell double frequencies

Let a network planner first check if the reported cases can be a problem. A correction needs a new frequency for one of the cells and may so easily lead into the need for a new plan over the area.

6.1.7 Adjacent cells having the same NCC, BCC and BCCH frequency

Report 076, **Adjacent cells having the same NCC, BCC and BCCH frequency**, shows pairs of cells that are adjacent cells of the same source cell and have the same NCC, BCC and BCCH frequency.

```
==================================================================================

                Adjacent cells having same NCC,BCC and frequency
              Source BSC:BSCABC ,BCF:SiteXX ,BTS (id):Sector1(22)

BSC_NAME        BCF_NAME        BTS_NAME        BTS_ID FREQ  NCC   BCC
--------------- --------------- --------------- ------ ----- ----- -----
BSC522          Site A          Sector 1        22     47    4     0
BSC523          Site B          Sector 2        42     47    4     0
```

Figure 23. Report 076: Adjacent cells having the same NCC, BCC and BCCH frequency

6.2 Non-unique CI and LAC

Normally the CI-LAC pair should be unique throughout the entire network. Run report **Non-unique CI and LAC** (066) to see all those cell identity - location area code pairs that are used more than once.

```
================================================================================

                                                                    BTS name
    LAC      CI BSC name (BTS id)      BCF name (BCF id)   (int_id)
```

```
------- ------- --------------------- ------------------ ---------------
      3   20024 Foreign BSC (3)       Foreign BCF (0)    Cid 20024
                                                         (9334)

                BSC2UPS1 (24)         PERTTD012 (12)     PERTTD2024
                                                         (3039)
```

Figure 24. Report 066: Non-unique CI and LAC

6.3 Base station audit

Most of the BCFs, BTSs, HOCs, POCs and even some adjacency parameters have the same value network-wide. It is up to the network planning to define the standard parameters.

Before you run these reports, upload the data from the network. This will ensure that the data the data in the Nokia NetAct database is valid.

6.3.1 Area level counts

The report **BTS parameter survey** (068) gives you a good overview of the default settings in the network or part of it.

Because the output of this report is long, the model presented here is shortened.

```
==============================================================================
=
=                  BTS PARAMETER SURVEY
=
=                  Network:            PLMN
=                  Selected area:      MR -   5
=
==============================================================================

This report shows the usage of the parameters in the network or part of it.
Included objects which has value <ACTUAL> in c_bts.

Instructions: Use the report 063 to find out the parameter differences on
the BTS level.

NOTE: This report does not include any parameters that enable handover.

==============================================================================


******************************************************************************
BSC Parameters
******************************************************************************

No of Preferred Cells (NPC)                                COUNT
-------------------------------------------------- ----------
     1                                                      1
     3                                                      1

GSM macrocell threshold (GMAC)                             COUNT
```

```
---------------------------------------------------- ----------
    35 dBm                                                    2
(SHORTENED)
********************************************************************************
BTS Identification Parameters
********************************************************************************

Frequency Band (BAND)                                     COUNT
---------------------------------------------------- ----------
GSM1800                                                      33
GSM900                                                       32
GSM1900                                                      16

BS Identity Code (BSIC)
***********************

Network Colour Code (NCC)                                 COUNT
---------------------------------------------------- ----------
     7                                                       80
     0                                                        1

BTS Colour Code (BCC)                                     COUNT
---------------------------------------------------- ----------
     4                                                       26
     0                                                       19
     2                                                       11
     3                                                        8
     1                                                        7
     5                                                        4
     6                                                        4
     7                                                        2

Location Area ID (LAI)
**********************

Mobile Country Code (MCC)                                 COUNT
---------------------------------------------------- ----------
   244                                                       81
(SHORTENED)
********************************************************************************
Frequency Hopping Parameters
********************************************************************************

BTS Hopping Mode (HOP)                                    COUNT
---------------------------------------------------- ----------
not hopping                                                  75
baseband hopping                                              6

MAIO Offset (MO)                                          COUNT
---------------------------------------------------- ----------
     0                                                       81

Mobile Alloc. Freq. List (MAL)                            COUNT
---------------------------------------------------- ----------
     1                                                       81

MAIO Step (MS)                                            COUNT
---------------------------------------------------- ----------
     1                                                       81

Hopping Sequency Number (HSN1)                            COUNT
---------------------------------------------------- ----------
   0                                                        231
   1                                                          6
   2                                                          6
(SHORTENED)
********************************************************************************
Cell Access Parameters
```

```
********************************************************************************

Cell Barred (BAR)                                                COUNT
--------------------------------------------------- ----------
No                                                                  81

Call Reestablishment Allowed (RE)                                COUNT
--------------------------------------------------- ----------
No                                                                  81

Emergency Call Restricted (EC)                                   COUNT
--------------------------------------------------- ----------
No                                                                  81

Power Offset (PO)                                                COUNT
--------------------------------------------------- ----------
     0                                                              81

GPRS enabled, S9 (GENA)                                          COUNT
--------------------------------------------------- ----------
Yes                                                                 79
No                                                                   2

ncc_0 ncc_1 ncc_2 ncc_3 ncc_4 ncc_5 ncc_6 ncc_7      COUNT
----- ----- ----- ----- ----- ----- ----- ----- ----------
                                             *           79
  *                                                       2

Note : '*' means the plmn is permitted.
(The report continues here: all parameters covered)
```

Figure 25. Report 068: BTS parameter survey

6.3.2 BSC parameter survey

The BSC parameter survey (077) report shows the usage of the BSCparameters in the network or part of it.

```
********************************************************************************
Miscellaneous Parameters
********************************************************************************

No of Preferred Cells (NPC)                                      COUNT
--------------------------------------------------- ----------
     1                                                               4
     3                                                               2

Emergency call on FACCH (EEF)                                    COUNT
--------------------------------------------------- ----------
No                                                                   3
Yes                                                                  3

MS distance behaviour (DISB)                                     COUNT
--------------------------------------------------- ----------
Call Clear Immediately                                               6

No of Ignored Transcoder Failures (ITCF)                         COUNT
--------------------------------------------------- ----------
     0                                                               6

Max BCF Capacity                                                 COUNT
--------------------------------------------------- ----------
```

```
    48                                                         2
    96                                                         2
    80                                                         1
   124                                                         1

Max BTS Capacity                                           COUNT
-------------------------------------------------- ----------
   128                                                         5
   248                                                         1

TRX Capacity HW                                            COUNT
-------------------------------------------------- ----------
    48                                                         2
    96                                                         2
    80                                                         1
   256                                                         1

TRX Capacity Real                                          COUNT
-------------------------------------------------- ----------
    48                                                         2
    96                                                         2
    80                                                         1
   256                                                         1

GSM macrocell threshold (GMAC)                             COUNT
-------------------------------------------------- ----------
     4                                                         5
     5                                                         1

GSM microcell threshold (GMIC)                             COUNT
-------------------------------------------------- ----------
     5                                                         6

DCS macrocell threshold (DMAC)                             COUNT
-------------------------------------------------- ----------
     2                                                         4
     0                                                         2

DCS microcell threshold (DMIC)                             COUNT
-------------------------------------------------- ----------
     3                                                         4
     0                                                         2

Background DB State                                        COUNT
-------------------------------------------------- ----------
New                                                            5
Clear                                                          1

Priority HO order interference DL (HDL)                    COUNT
-------------------------------------------------- ----------
Inter-cell                                                     6

Priority HO order interference UL (HUL)                    COUNT
-------------------------------------------------- ----------
Inter-cell                                                     6

BCSU Number                                                COUNT
-------------------------------------------------- ----------
     3                                                         2
     6                                                         2
     4                                                         1
     5                                                         1

Max TRX Number in BCSU                                     COUNT
-------------------------------------------------- ----------
    16                                                         5
    64                                                         1
```

```
Load Rate for Channel Search, S9 (CLR)                      COUNT
--------------------------------------------------- ----------
   100 %                                                     5
    99 %                                                     1

Variable DL Step Use, S9  (VDLS)                            COUNT
--------------------------------------------------- ----------
No                                                           6

Territory Update Guard Time GPRS, S9  (GTUGT)               COUNT
--------------------------------------------------- ----------
     5                                                       5
     2                                                       1

Disable Int HO (DINHO)                                      COUNT
--------------------------------------------------- ----------
No                                                           6

Disable Ext DR (DEXDR)                                      COUNT
--------------------------------------------------- ----------
No                                                           6

RX Lev Balance (RXBAL)                                      COUNT
--------------------------------------------------- ----------
     5                                                       6
Enter value for wait:


********************************************************************************
Supervision 1
********************************************************************************

FR TCH Alarm Limit (ALFRT)                                  COUNT
--------------------------------------------------- ----------
    30                                                       6

HR TCH Alarm Limit (ALHRT)                                  COUNT
--------------------------------------------------- ----------
    30                                                       6

TCH High Intf Alarm Thr (HIFSHR)                            COUNT
--------------------------------------------------- ----------
    50                                                       6

SDCCH Alarm Limit (ALSDC)                                   COUNT
--------------------------------------------------- ----------
    30                                                       3
    20                                                       2
    25                                                       1

LAPD Load Thr (LAPDL)                                       COUNT
--------------------------------------------------- ----------
   150                                                       6

BCSU Load Thr(BCSUL)                                        COUNT
--------------------------------------------------- ----------
   150                                                       6

Alarm Thr for TCH Failure (TCHFR)                           COUNT
--------------------------------------------------- ----------
    20                                                       4
    50                                                       1
    60                                                       1

Alarm Thr for SDCCH Failure (SCHFR)                         COUNT
--------------------------------------------------- ----------
    80                                                       6
```

```
Alarm Thr for TCH Cong (CNGT)                          COUNT
-------------------------------------------------- ----------
    20                                                     6

Alarm Thr for SDCCH Cong (CNGS)                        COUNT
-------------------------------------------------- ----------
    20                                                     5
    50                                                     1

Alarm Thr for No of CH Seiz (CS)                       COUNT
-------------------------------------------------- ----------
    10                                                     6

Alarm Thr for No of CH Seiz Req (CSR)                  COUNT
-------------------------------------------------- ----------
   100                                                     6

Min Mean Hold Time for TCH (MINHTT)                    COUNT
-------------------------------------------------- ----------
     2                                                     3
     3                                                     2
    10                                                     1

Max Mean Hold Time for TCH (MAXHTT)                    COUNT
-------------------------------------------------- ----------
  1440                                                     4
   120                                                     2

Max Mean Hold Time for SDCCH (MAXHTS)                  COUNT
-------------------------------------------------- ----------
    30                                                     6

MS Speed Class 1 UL (MSSCF)                            COUNT
-------------------------------------------------- ----------
    10                                                     6

MS Speed Class 2 UL (MSSCS)                            COUNT
-------------------------------------------------- ----------
    30                                                     6

Thr for High TCH Intf Level (HIFLVL)                   COUNT
-------------------------------------------------- ----------
     4                                                     6

RX Antenna Supervision Period (RXANT)                  COUNT
-------------------------------------------------- ----------
 65535                                                     6


*******************************************************************************
Supervision 2
*******************************************************************************


Prd for TCH Mean Hold. Time Superv (PRDMHT)            COUNT
-------------------------------------------------- ----------
   240                                                     6

Prd for SDCCH Mean Hold. Time Superv (PRDMHS)          COUNT
-------------------------------------------------- ----------
    60                                                     6

Prd for Superv. of BTS with no Transact (PRDBNT)       COUNT
-------------------------------------------------- ----------
Not defined                                                5
   120                                                     1
```

```
Prd for High TCH Interference Superv (PRDHIF)           COUNT
--------------------------------------------------- ----------
   120                                                       6

Meas Prd for Superv. of CH. Failure Rate (PRDCFR)       COUNT
--------------------------------------------------- ----------
    60                                                       5
    30                                                       1

Meas Prd for Superv. of Congestion on BTS (PRDCNG)      COUNT
--------------------------------------------------- ----------
   120                                                       6


********************************************************************************
OPT Parameters
********************************************************************************


BTS battery backup forced ho timer (TIM)                COUNT
--------------------------------------------------- ----------
    30                                                       6

Load Lower Dependent TCH Rate (HRL)                     COUNT
--------------------------------------------------- ----------
   100                                                       6

Load Upper Dependent TCH Rate (HRU)                     COUNT
--------------------------------------------------- ----------
     0                                                       6

TCH rate internal HO (HRI)                              COUNT
--------------------------------------------------- ----------
Preferred rate                                               5
Actual rate                                                  1

Answer to paging call on FACCH (EPF)                    COUNT
--------------------------------------------------- ----------
No                                                           6

Call re-establishment on FACCH (ERF)                    COUNT
--------------------------------------------------- ----------
No                                                           6

Ordinary call on FACCH (EOF)                            COUNT
--------------------------------------------------- ----------
No                                                           6

BSC Call Number (BCN)                                   COUNT
--------------------------------------------------- ----------
     0                                                       3
     0                                                       2
######                                                       1

Good Qual Limit (GQL)                                   COUNT
--------------------------------------------------- ----------
   100                                                       6

Bad Qual Limit(BQL)                                     COUNT
--------------------------------------------------- ----------
   100                                                       6

Sig Qual Limit 1 (SQL1)                                 COUNT
--------------------------------------------------- ----------
   100                                                       6

Sig Qual Limit 2 (SQL2)                                 COUNT
--------------------------------------------------- ----------
```

```
   100                                                     6

TCH Probability 1 (TCP1)                               COUNT
-------------------------------------------------- ----------
   100                                                     6

TCH Probability 2 (TCP2)                               COUNT
-------------------------------------------------- ----------
   100                                                     6

TCH Probability 3 (TCP3)                               COUNT
-------------------------------------------------- ----------
   100                                                     6

AMH Lower Load Threshold (ALT)                         COUNT
-------------------------------------------------- ----------
    20                                                     6

AMH Max Load Of Tgt Cell (AML)                         COUNT
-------------------------------------------------- ----------
    70                                                     6

AMH Upper Load Threshold (AUT)                         COUNT
-------------------------------------------------- ----------
    80                                                     6

AMH Trho Guard Time (TGT)                              COUNT
-------------------------------------------------- ----------
    30                                                     6


*******************************************************************************
Trunk Reservation
*******************************************************************************


Priority Level / Subscriber Type 1 (PR)                COUNT
-------------------------------------------------- ----------
GSM                                                        6

Priority Level / Subscriber Type 2 (PR)                COUNT
-------------------------------------------------- ----------
GSM                                                        6

Priority Level / Subscriber Type 3 (PR)                COUNT
-------------------------------------------------- ----------
GSM                                                        6

Priority Level / Subscriber Type 4 (PR)                COUNT
-------------------------------------------------- ----------
GSM                                                        6

Priority Level / Subscriber Type 5 (PR)                COUNT
-------------------------------------------------- ----------
GSM                                                        6

Priority Level / Subscriber Type 6 (PR)                COUNT
-------------------------------------------------- ----------
GSM                                                        6

Priority Level / Subscriber Type 7 (PR)                COUNT
-------------------------------------------------- ----------
GSM                                                        6

Priority Level / Subscriber Type 8 (PR)                COUNT
-------------------------------------------------- ----------
GSM                                                        6
```

```
Priority Level / Subscriber Type 9 (PR)                 COUNT
-------------------------------------------------- ----------
GSM                                                         6

Priority Level / Subscriber Type 10 (PR)                COUNT
-------------------------------------------------- ----------
GSM                                                         6

Priority Level / Subscriber Type 11 (PR)                COUNT
-------------------------------------------------- ----------
GSM                                                         6

Priority Level / Subscriber Type 12 (PR)                COUNT
-------------------------------------------------- ----------
GSM                                                         6

Priority Level / Subscriber Type 13 (PR)                COUNT
-------------------------------------------------- ----------
GSM                                                         6

Priority Level / Subscriber Type 14 (PR)                COUNT
-------------------------------------------------- ----------
GSM                                                         6
```

Figure 26. Report 077: BSC parameter survey

6.3.3 BTS level deviations

The report **BTS audit** (063) is network dependent because the band (GSM900, GSM1800, GSM1900) specific default values are defined in the database. These default values should be modified according to the network to receive the shortest output.

To work with this report:

1. Select the cell which has correct parameters for the band used and run the report. Discuss the output with the network planning engineers to agree on the default values.

2. Change the settings in the Nokia NetAct database using the Top-level User Interface according to the radio network plan.

3. Select a BTS area and run the report again to reveal the deviations.

As the output of the report is long, only an extract of it is shown here.

```
================================================================================
=
=                          BTS AUDIT
=
=                  Network:        PLMN
=                  Area:           BTS: MAKKYL2012 (BCF: MAKKYL006)
=                  Band:           GSM1800
=                  Parameter set : All
=
================================================================================

The checking is done over the BTSs in the selected area that use the defined
```

```
band. The defaults are listed below. All discrepancies are reported.
A comparison is made against the defaults stored in the Nokia NetAct database.
If the defaults are not yet generated they are inserted by this script.
There is one default set for each of three possible bands:
<DEFAULT>GSM900, <DEFAULT>GSM1800, <DEFAULT>GSM1900.
The defaults can be modified by using GUI.

Instructions:
1) Run this report against a cell that you would like to use as default.
.  Then you will see how the defaults differ from the model cell.
2) Correct the defaults by using GUI.
3) Run over larger area of cells.

Note: The checking will take a long time if a large area is selected.
.     Patience please.
Note: There is an alternative for this report:
.     GUI Utils/ Nw Configuration Management/Printing RNW parameters
.     choose BSS_Compare_Report.txt  from template files

===============================================================================

*******************
BSC Parameter Audit
*******************


===============================================================================
= No of Preferred Cells
===============================================================================
No of Preferred Cells specifies the number of preferred cells the BSC should
include in a Handover Required Message sent to the MSC.
Name in BSC:            NPC
Name in NMS dbase:      no_of_pref_cells
Name in NMS GUI:        No of PrefCells


===============================================================================
= GSM macrocell threshold
===============================================================================
Name in BSC:            GMAC
Name in NMS dbase:      gsm_macrocell_threshold
Name in NMS GUI:        GSM Macrocell Threshold


===============================================================================
= GSM microcell threshold
===============================================================================
Name in BSC:            GMIC
Name in NMS dbase:      gsm_microcell_threshold
Name in NMS GUI:        GSM Microcell Threshold


===============================================================================
= DCS macrocell threshold
===============================================================================
Name in BSC:            DMAC
Name in NMS dbase:      dcs_macrocell_threshold
Name in NMS GUI:        DCS Macrocell Threshold


===============================================================================
= DCS microcell threshold
===============================================================================
Name in BSC:            DMIC
Name in NMS dbase:      dcs_microcell_threshold
Name in NMS GUI:        DCS Microcell Threshold
(REPORT SHORTENED HERE)
```

```
================================================================================
= TRXs WITH NON ALLOWED FREQ. IN THE NETWORK (freq. >=       1023 )
================================================================================
Every operator has only a limited number of frequencies in use. Having
accidetally a cell with frequency out of this band will interfere
the other operators.


================================================================================
= TRXs WITH NON ALLOWED FREQ. IN THE NETWORK (freq. <=          1 )
================================================================================
Every operator has only a limited number of frequencies in use. Having
accidentally a cell with frequency out of this band will interfere the
other operators.
```

Figure 27. Report 063: BTS audit

6.4 Checking the adjacency plan

To check that the adjacency plan is implemented correctly in Nokia NetAct, run the report **Adjacencies of cells** (074) and compare the plan and the report manually. This is, however, a time-consuming job because a typical cell has on average 5 to 10 adjacencies. As this report produces a very long output, it should not be run unnecessarily for a large area.

```
================================================================================

=
=                   ADJACENCIES OF CELLS
=
=                   Network:            PLMN
=                   Area:               BSC - BSC3NYK
=                   Sorting:            BSC name, BTS id, frequency
=
================================================================================

For each adjacency the following parameters are output.

LAC                     Location Area Code of the target cell.
CI                      Cell Identification of the target cell.
BCC                     Base Station Colour Code of the target cell.
FREQ                    BCCH frequency of the target cell.

================================================================================


BSC name   BCF name        Adj. BCF name
(BTS id)   BTS name        Adj. BTS name
           Band            Adj. BTS band      LAC      CI  BCC  FREQ
---------- --------------- --------------- ------ ------ ---- -----
BSC3NYK    HATANP001       HATANP001            3  30002    0   594
(1)        HATANP3001      HATANP30002
           GSM1800         GSM1800

                           HATANP001            3  30003    0   596
                           HATANP30003
                           GSM1800

BSC3NYK    HERMIA004       HERMIA003            3  30007    4    28
```

```
(10)        HER3AD3010       HER3CG3007
            GSM1800          GSM900

                             HERMIA003             3  30008    4    82
                             HER3CG3008
                             GSM900
```

Figure 28. Report 074: Adjacencies of cells

Sometimes there are too many or too few adjacencies defined in the plan. Adjacencies can also be accidentally implemented. Adjacency problems can be easily detected by running the report **BTSs with maximum number of adjacencies** (070),

```
===============================================================================


                                                            Adjacency
BSC (BTS id)         BCF             BTS                        Count
-------------------- --------------- --------------- ---------
BSC1KUTOJA(15)       KILONKALLIO008  KKALLI1015                    14
BSC1KUTOJA(14)       KILONKALLIO008  KKALLI1014                    13
BSC4TRE(2)           1800_3Cil       2HERMIA3C                     11
```

Figure 29. Report 070: BTSs with maximum number of adjacencies

or the report **BTSs with minimum number of adjacencies** (071).

```
===============================================================================


                                                            Adjacency
BSC (BTS id)         BCF             BTS                        Count
-------------------- --------------- --------------- ---------
BSC4TRE(20)          900_Leo         20HERMIA                       1
BSC4TRE(33)          4kellari        33HERMIAKELLARI                1
BSC1KUTOJA(10)       LAAJAL010       LAAJAL1010                     2
BSC1KUTOJA(2)        KUTOJA001       KUTOJA1002                     2
BSC1KUTOJA(6)        SUOSAA004                                      2
```

Figure 30. Report 071: BTSs with minimum number of adjacencies

You may check the adjacency plan also with the help of the Undefined Adjacent Cell measurement.

You can see the defined and undefined adjacencies of a particular cell with the help of the report **Defined, undefined and used adjacencies of a cell** (072).

```
===============================================================================
=
=                   DEFINED, UNDEFINED AND USED ADJACENCIES OF A CELL
=
=                   Network:            PLMN
=                   BSC:                BSC2UPS1
=                   BTS id, BTS name:   (11) 5KOM2011
=                   BTS CI:                  20011
=                   BTS LAC:                     2
=                   Period:             from 19990610 to 19990610
=
===============================================================================

This report shows the defined adjacencies (from the Nokia NetAct database) and
undefined adjacencies as seen and reported by a BSC.

===============================================================================
-
===============================================================================
=                    UNDEFINED ADJACENT CELLS OF BTS
=                 BSC2UPS1        bts id:11  name:5KOM2011
=                  from 19990610 to 19990610
===============================================================================

NOTE: This measurement is an optional feature in the BSC.

NCC                 13003          Nework Colour Code of undef.adj.cell
BCC                 13003          Base Sation Colour Code of undef.adj.cell
BCCH                13003          BCCH carrier number (ARFN)
AVG DL SIG STR      13001/13002    Average DL signal strength received from
.                                  undefined cell
Nbr of samples      13002          Number of samples that the result is based on
===============================================================================

                                                              Nbr of
  BCCH   NCC    BCC DD HR AVG DL SIG STRENGTH       samples
------ ----- ----- -- -- ------------------------ -------
   600     7      6 10 10 from -99dBm to -98dBm           9
                  6 10 11 from -106dBm to -105dBm        12
                  6 10 15 from -101dBm to -100dBm         2
-
===============================================================================
=
=                        BTS ADJACENCIES
=
=                        BSC:          BSC2UPS1
=                        BTS id:       11
=                        BTS name:     5KOM2011
=                        Period:       from 19990610 to 19990610
=
===============================================================================

BSC   Nokia NetAct Name                Description
===   =============                ===========

LAC   LAC                          Location Area Code of the target cell.
CI    CellID                       Cell Identification of the target cell.
FREQ  BCCH Freq                    BCCH frequency of the target cell.
BCC   BSIC                         Base Station Colour Code of the target cell.
NCC   BSIC                         Network Colour Code of the target cell.
SYNC  Synchronized                 Indicates if synchronization used.
PRI   HO priority level            Relative Priority level of the target cell.
SL    Rx Lev Min Cell              Mininimum signal level to make HO to the
.                                  target cell.
PMAX  Ms Tx Pwr Max Cell           Maximum transmit power MS can use in the
.                                  target cell.
PMRG  HO Margin PBGT               Power Budget HO margin.
```

```
QMRG  HO Margin Qual              Prevents repetitive HOs. Used when bad
.                                 quality causes HO.
LMRG  HO Margin Level             Prevents repetitive HOs. Used when low
.                                 signal level causes HO.
AUCL  HO Level Umbrella           Value of this param. is used instead of
.                                 RxLevMinCell if adj.cell is umbrella cell
MRGS  Enable HO Margin Lev Qual   Indicates if Ho Margin Level and HO Margin
.                                 Qual are considered in HO process.
OF    HO Load Factor              The relative priority of the adjacent cell
.                                 is decreased in case the cell is considered
.                                 overloaded.
POPT  MS pwr optimization         Indicates whether the RF power level the MS
.                                 uses in the new cell after HO is optimized
.                                 (related to optional feature 140 in BSC)
.                                 Y=optimized, N= not optimized
LEV   UL level                    Indicates the desired UL level after HO when
.                                 level is optimized optimized
.                                 (related to optional feature 140 in BSC)
CHAIN Chained adj. cell           Indicates whether an adjacent cell is defined
.                                 as a chained cell.
TRHO  Threshold target level      Defines minimum signal level when a handover
.                                 caused by traffic reason is allowed to an
.                                 adjacent cell.
FMT   Fast moving threshold       Threshold to compared with the
.                                 indentification in the adjacent cell.
ACL   Adjacent cell layer         Adj. cell layer in relation to serving cell.
.                                 NU = Not Used, SL = Same Layer,
.                                 UL = Upper Layer, LL = Lower Layer
USED                              '*' = adjacency has been used (1 or more attempts
)
.                                 '-
' = adjacency not used (0 attempts or no Ho adj.
.                                       cell measurment not available)
===============================================================================


Outgoing Adjacencies
====================

                                                                C
TO:                         S                  P A  M    P      H T          U
BTS             LAC         Y  P       PMRG    M U  R    O    L A R    F  A  S
BCF             CI     NCC  N  R     S LMRG    A C  G  O P    E I H    M  C  E
BSC (BTS)       FREQ   BCC  C  I     L QMRG    X L  S  F T    V N O    T  L  D
--------------- ------ --- - -- ---- ---- --- -- - -- - ---- - ---- -- -- -
1UPS2004        2      7    N  3 -100 6      30 NA Y  1 N -110 N NU   0  NU -
1UPS002         20004  6              3
BSC2UPS1 (4)    592                   0

1UPS2005        2      7    N  3 -100 6      30 NA Y  1 N -110 N NU   0  NU *
1UPS002         20005  6              3
BSC2UPS1 (5)    605                   0

3UPS2002        2      7    N  3 -100 6      30 NA Y  1 N -110 N NU   0  NU -
3UPS001         20002  7              3
BSC2UPS1 (2)    600                   0

5KOM2009        2      7    N  3 -100 6      30 NA Y  1 N -110 N NU   0  NU -
5KOM005         20009  5              3
BSC2UPS1 (9)    593                   0

5KOM2010        2      7    N  3 -100 6      30 NA Y  1 N -110 N NU   0  NU -
5KOM005         20010  5              3
BSC2UPS1 (10)   598                   0

HIPPOS2019      2      7    N  3 -100 6      30 NA Y  1 N -110 N NU   0  NU -
HIPPOS009       20019  3              3
BSC2UPS1 (19)   593                   0
```

```
Incoming Adjacencies
====================

                                                             C
FROM:                      S                P A  M    P      H T          U
BTS             LAC        Y  P      PMRG   M U  R    O    L A R    F  A  S
BCF             CI     NCC N  R    S LMRG   A C  G  O P    E I H    M  C  E
BSC (BTS)       FREQ   BCC C  I    L QMRG   X L  S  F T    V N O    T  L  D
--------------- ------ --- - -- ---- ---- --- -- - -- - ---- - ---- -- -- -
1UPS2004        2      7   N  3 -100 6     30 NA Y  1 N -110 N NU   0  NU -
1UPS002         20004  5             3
BSC2UPS1 (4)    770                  0

1UPS2005        2      7   N  3 -100 6     30 NA Y  1 N -110 N NU   0  NU -
1UPS002         20005  5             3
BSC2UPS1 (5)    770                  0

3UPS2002        2      7   N  3 -100 6     30 NA Y  1 N -110 N NU   0  NU -
3UPS001         20002  5             3
BSC2UPS1 (2)    770                  0

5KOM2009        2      7   N  3 -100 6     30 NA Y  1 N -110 N NU   0  NU -
5KOM005         20009  5             3
BSC2UPS1 (9)    770                  0

5KOM2010        2      7   N  3 -100 6     30 NA Y  1 N -110 N NU   0  NU -
5KOM005         20010  5             3
BSC2UPS1 (10)   770                  0

HIPPOS2017      2      7   N  3 -100 6     30 NA Y  1 N -110 N NU   0  NU -
HIPPOS009       20017  5             3
BSC2UPS1 (17)   770                  0

HIPPOS2018      2      7   N  3 -100 6     30 NA Y  1 N -110 N NU   0  NU -
HIPPOS009       20018  5             3
BSC2UPS1 (18)   770                  0

HIPPOS2019      2      7   N  3 -100 6     30 NA Y  1 N -110 N NU   0  NU -
HIPPOS009       20019  5             3
BSC2UPS1 (19)   770                  0

KKALLI1014      1      7   N  3 -100 6     30 NA Y  1 Y  -47 N NU   0  NU -
KILONKALLIO008  10014  5             3
BSC1KUTOJA (14) 770                  0

KKALLI1015      1      7   N  3 -100 6     30 NA Y  1 Y  -47 N NU   0  NU -
KILONKALLIO008  10015  5             3
BSC1KUTOJA (15) 770                  0

MAKKYL2012      2      7   N  3 -100 6     30 NA Y  1 N -110 N NU   0  NU -
MAKKYL006       20012  5             3
BSC2UPS1 (12)   770                  0

MAKKYL2013      2      7   N  3 -100 6     30 NA Y  1 N -110 N NU   0  NU -
MAKKYL006       20013  5             3
BSC2UPS1 (13)   770                  0

-
===============================================================================
=
=                   HANDOVER ADJACENT CELL
=
=                   BSC:         BSC2UPS1
=                   BTS id:      11
=                   BTS name:    5KOM2011
```

```
=                    Period:      from 19990610 to 19990610
=
===============================================================================

NOTE: This measurement is an optional feature in the BSC.

NOTE: The CI, LAC reported are as seen by BSC. Check that the cells listed
.     are in the adjacenies. If not then upload data from nw and rerun this
.     report. If not corrected turn to OMC support engineers.

LAC              15000     Location Area Code
CI               15000     Cell Identifier
HO => Att        15001     Outgoing HO attempts
HO => Fail (%)   hfr_58    Outgoing HO failure ratio of non blocked attempts
HO => Blck (%)   blck_19   Outgoing HO blocking  (S6)
HO <= Att        15003     Incoming HO attempts
HO <= Fail (%)   hfr_59    Incoming HO failure ratio of non blocked attempts
HO <= Blck (%)   blck_20   Incoming HO blocking (S6)

===============================================================================

Source
******                                                 Target
BTS NAME              HO=> HO=> <=HO <=HO       Target ******
BCF NAME         HO=> **** **** **** ****  <=HO ****** BTS NAME
BSC NAME         **** Blck Fail Fail Blck  **** LAC    BCF NAME
(BTS)             Att  (%)  (%)  (%)  (%)   Att CI     BSC NAME (BTS)
--------------- ----- ---- ---- ---- ---- ----- ------ ----------------
5KOM2011            4    0   25    0    0     0 2      1UPS2005
5KOM005                                         20005  1UPS002
BSC2UPS1                                               BSC2UPS1
(11)                                                   (5  )
```

Figure 31. Report 072: Defined, undefined and used adjacencies of a cell

To see the results of undefined adjacent cells measurement for all BTSs in an area, run the report **Undefined adjacent cells** (073).

```
===============================================================================

=
=                    UNDEFINED ADJACENT CELLS
=
=                    Network:        PLMN
=                    Area:           All BTSs selected
=                    Period:         from 20000120 to 20000121
=                    Time aggregation:   whole period
=                    Threshold:       100 samples
=
===============================================================================

This report gives all undefined adjacent cells UAC (cells measured by MS but
not defined as neighbour of the serving cell) for all BTSs in the selected area.
This information can be used to check the network plan for adjacencies.

NCC               /c13003        Nework Colour Code of UAC.
BCC               /c13003        Base Sation Colour Code of UAC.
BCCH              /c13003        BCCH carrier number (ARFN) of UAC.
Per dura                         Average period duration.
Nbr of per                       Number of periods.
Nbr of samples    /c13002        Nbr of samples for calculating the average
.                                DL signal stregth (*100).
Avg DL sig str    /c13001        Average DL signal strength received from UAC.
Sort factor        /dll_2        Sorting factor
```

```
.                                (averge level * nbr of samples)/1000

Sorting is by cell and time if daily or hourly resolution is selected.
Sorting is by sorting factor if time aggregation is 'average'.

Note: Undefined cells measurement is an optional feature in the BSC.
Note: Running this report takes a while. Patience please.

NOTE:
If "Active BA list = adjacent cell definitions) or
If "Active BA list = idle BA list = 0" (active BA list = adj. cell definitions)
.  BSC uses adj. cell definitions when it matches the BA indexes and the BCCH
If "Active BA list = idle BA list = list 1"
.  BSC uses "list 1" when it matches the BA indexes and the BCCH

===============================================================================



                                                  Nbr
                               Per Nbr       of Avg DL
BSC Name                      dura of  samples sig str      Sort
BTS Name        BCCH NCC BCC  (hr) per  (*100) (dBm)      factor
--------------- ---- --- --- ----- --- ------- ---------- ------
BSC1KUTOJA        78   7   1   1.0  14     328 -93..-92      609
SANDPG1018
```

Figure 32. Report 073: Undefined adjacent cells

For the **BTSs with maximum number of adjacencies between LAs** (075) report no measurement is used but the data is retrieved from CM tables. Note that adjacencies between LAs can cause numerous location updates.

```
===============================================================================


                BTSs with max nbr of adjacencies to different LA

                                                      Nbr of adjacencies
                                                   to cells in different
BSC (BTS id)       BCF             BTS                     Location Area
------------------ --------------- --------------- ---------------------
BSC1KUTOJA(14)     KILONKALLIO008  KKALLI1014                         11
BSC1KUTOJA(15)     KILONKALLIO008  KKALLI1015                          8
BSC1KUTOJA(17)     SANDPG009       SANDPG1017                          3
BSC1KUTOJA(20)     SANDPD010       SANDPD1020                          3
BSC1KUTOJA(9)      LAAJAL009       LAAJAL1009                          3
BSC1KUTOJA(19)     SANDPD010       SANDPD1019                          3
BSC1KUTOJA(18)     SANDPG009       SANDPG1018                          3
BSC3TRE(1)         HATANP001       HATANP3001                          3
BSC1KUTOJA(11)     KILO007         KILO1011                            1
BSC1KUTOJA(16)     KILONKALLIO008  KKALLI1016                          1
BSC1KUTOJA(12)     KILO007         KILO1012                            1
BSC1KUTOJA(6)      SUOSAA004                                           1
BSC4TRE(5)         900_3Cil        5HERMIA3C                           1
BSC1KUTOJA(2)      KUTOJA001       KUTOJA1002                          1
BSC1KUTOJA(13)     KILO007         KILO1013                            1
```

Figure 33. Report 075: BTSs with maximum number of adjacencies between LAs

6.5 Checking the frequency plan

The frequency plan is the basic setting of the network. Since the plan is very often inserted manually via Nokia NetAct, errors may easily occur. To check the plan manually, use the report **Frequency plan** (111).

```
===============================================================================
=
=                   FREQUENCY PLAN
=
=                   Network:            PLMN
=                   Area:               All BTSs selected
=                   Sorting key:        source BCF name, source BTS name
=                   Filter:             Only hopping TRX shown
=
===============================================================================

This report shows the frequency plan related information about the BTS.
The following data is given for each TRX:

TRX freq             TRX frequency (intital)

TRX use
.                    BCCH = BCCH used in TRX
.                    TCH  = BCCH not used in TRX

BCCH tsl0           Channel type of time slot 0 of BCCH TRX
BCCH tsl1           Channel type of time slot 1 of BCCH TRX

LAC                  Location area code
RAC                  Routing area code
CI                   Cell identifier
BCC                  Base station colour code
NCC                  Network colour code

BCF, BTS, TRX states
.                    N = No state
.                    U = Unlocked
.                    S = Shutting down
.                    L = Locked

Hopping             Hopping mode (None, baseband, rf)
HSN1                Hopping sequence number
MA list id          MA list reference id (lists shown in the end of report)
MAIO offset
MAIO step


Running this report takes a while. Patience please.

===============================================================================
                              Frequency plan. All BTSs selected

             !                     !                    !          !          !
             !                     !                    !          !          !
BSC          !BCF                  !BTS                 !    BTS_ID!       LAC!
-------------!---------------------!--------------------!----------!----------!
BSC4TRE      !1800_3Ail            !8HERMIA3A           !         8!         4!
BSC4TRE      !1800_3Ail            !8HERMIA3A           !         8!         4!
BSC4TRE      !3C1krs               !22HERMIA3C1KRS      !        22!         4!


          !          !    !      !    !BCCH    !BCCH    !    !    !     !     !     !
          !          ! TRX!   TRX!TRX !tsl0    !tsl1    !    !    !BCF  !BTS  !TRX  !
       RAC!        CI!  id!  freq!use !type    !type    ! BCC! NCC!state!state!state!
```

```
----------!----------!----!-----!----!-------!-------!----!----!-----!-----!-----!
        44!       408!   3!  774!BCCH!MBCCHC !SDCCB  !   4!   7!U    !U    !U    !
        44!       408!   4!  781!TCH !       !       !   4!   7!U    !U    !U    !
        45!       422!   1! 1013!TCH !       !       !   4!   7!U    !U    !U    !

        !          !        MA!          !
        !          !      list!      MAIO!      MAIO
HOPPING !      HSN1!        id!    offset!      step
--------!----------!----------!----------!----------
Baseband!          !         1!         0!         1
Baseband!          !         1!         0!         1
Baseband!          !         1!         0!         1

Carrier frequencies of the MA list id for RF hopping

                    !MA        !
                    !list      !
BSC Name            !id        !Frequency
--------------------!----------!---------
BSC MERKURIUS       !1         !      770
                               !      772
                               !      776
                    !2         !      770
                               !      772
                               !      776
```

Figure 34. Report 111: Frequency plan

6.6 Checking the administrative states

The administrative state of a radio network element (BCF, BTS, TRX, Channel) can be unlocked, locked or in the process of shutting down. It would be wise to regularly check that only elements which are planned to be locked, are actually locked. This is easy to do by running the report **Find locked BCFs, BTSs, TRXs and channels** (050).

```
===============================================================================
=
=                   FIND LOCKED BCFs, BTSs, TRXs AND CAHNNELS
=
=                   Network:            PLMN
=                   Area:               All BTSs selected
=
===============================================================================

This report lists
- all locked BCFs
- all locked BTSs
- all locked TRXs
- all locked channels

Decoding of states:
N= No state
U= Unlocked
S= Shutting down
L= Locked
```

```
TRX use:
BCCH = BCCH used in TRX
TCH  = BCCH not used in TRX


================================================================================


**********************************************************************
*********************** Locked BCFs **********************************
**********************************************************************

                                BCF
BSC name        BCF name        nbr
--------------- --------------- ---
BSC1KUTOJA      LAAJAL010       6
BSC2UPS1        BSC2UPS1        8


**********************************************************************
*************** Locked BTSs (BCF unlocked) ***************************
**********************************************************************

                                                BCF/BTS BCF BTS
BSC name        BCF name        BTS name        states  id  id
--------------- --------------- --------------- ------- --- ---
BSC1KUTOJA      KILO007         KILO1012        UL      7   12
                KUTOJA001       KUTOJA1001      UL      1   1
BSC2UPS1        PERTTG011       PERTTG2022      UL      11  22
BSC4TRE         900_Leo         19LEONIA        UL      7   19


**********************************************************************
************ Locked TRXs (BCF and BTS unlocked)  *********************
**********************************************************************

                                                BCF/BTS/
                                                TRX      BCF BTS TRX TRX
BSC name        BCF name        BTS name        states   id  id  id  use
--------------- --------------- --------------- -------- --- --- --- ----
BSC1KUTOJA      SANDPG009       SANDPG1018      UUL      9   18  4   TCH
BSC2UPS1        3UPS001         3UPS2003        UUL      1   3   7   TCH
                HIPPOS009       HIPPOS2017      UUL      9   17  1   TCH
BSC4TRE         900_3Cil        4HERMIA3C       UUL      2   4   1   TCH
                900_3Cil        4HERMIA3C       UUL      2   4   2   TCH
                900_3Cil        5HERMIA3C       UUL      2   5   4   TCH
```

Figure 35. Report 050: Find locked BCFs, BTSs, TRXs and channels

6.7 BTS state conflict between BSC and MSC

The BTS state conflict between BSC and MSC (078) report checks if the administrative state of BTS in MSC is different than the state in BSC:

- cell unlocked in MSC but either BCF or BTS is locked in BSC
- cell locked in MSC but BCF and BTS are unlocked in BSC (causes LUs)

```
Cell unlocked in MSC but BCF or BTS locked in BSC
```

```
                                                                 BTS
                                                                 state
                  BCF                                      BTS   in
BCF name          state BTS name        BTS_INT_ID state MSC     MSC name
-------------     ----- -------------   ---------- ----- -----   -------------
2000_CITYFLEX     L     CITYFLX1             49859 U     U       MSC_1
I
```

```
                Cell locked in MSC but BCF and BTS unlocked in BSC

                                                                 BTS
                                                                 state
                  BCF                                      BTS   in
BCF name          state BTS name        BTS_INT_ID state MSC     MSC name
-------------     ----- -------------   ---------- ----- -----   -------------
1048_DOWNTWN      U     PENTRPS1             48511 U     L       MSC_1
1048_DOWNTWN      U     PENTRPS2             48527 U     L       MSC_1
1048_DOWNTWN      U     PENTRPS3             48556 U     L       MSC_1
```

Figure 36. Report 078: BTS state conflict between BSC and MSC

6.8 Parameters

6.8.1 AMR parameters

For a model report, see chapter Adaptive Multirate, **AMR Parameters** (053)

6.8.2 EGPRS parameters

For a model report, see chapter GPRS, **EGPRS Parameters** (055)

7 Quality of the radio network plan

The quality of the radio network plan indicates the ability of the network to perform during normal load.

To check how well your radio network plan functions, use the following indicators:

- SDCCH drop call ratio (or SDCCH success ratio)
- TCH drop call ratio (or TCH success ratio)
- HO failure ratio

When these measurements are run for the first time from Nokia NetAct, they do not only cover the problems related to radio network planning but also the problems resulting from mistakes in the deployment of the plan into the network. Normally the first step is to correct those mistakes before going on to search for the possible errors in the radio network plan itself. Trying to spot and correct the mistakes made in the implementation can be a very time-consuming job.

To see the *daily* values for the quality of the radio network plan on the BTS area level, run the report **Performance statistics (benchmark)** (200).

Only part of the report is shown here.

Day	MMDD	SDCCH access probab (%) csf_1	SDCCH access probab (%) csf_1a	SDCCH success ratio (%) csf_2e	SDCCH success ratio (%) csf_2m	TCH access probab (%) csf_3m	TCH access probab (%) csf_3i	TCH access probab (%) csf_3l	TCH success ratio (%) csf_4u	TCH success ratio (%) csf_4v
tue	0409	99.98	99.98	94.61	77.85	98.67	98.67	99.85	95.96	95.96
mon	0408	100.00	100.00	96.13	83.66	98.78	98.78	99.65	95.66	95.66
sun	0407	100.00	100.00	98.51	99.01	97.09	97.09	99.51	83.90	83.90
sat	0406	100.00	100.00	98.21	94.03	99.67	99.67	100.00	96.00	96.00
fri	0405	100.00	100.00	98.22	77.55	97.62	97.62	98.90	94.96	94.96

Day	MMDD	Call bids trf_39a	TCH time (hr) trf_24c	HO/ Calls (%) trf_13e	TCH Usage (%) trf_3	Avg call lgth (sec) trf_2d	AG block (%) blck_13
tue	0409	4510	194	21.15	0.72	154	0.000
mon	0408	3666	172	24.80	0.71	168	0.000
sun	0407	205	84	130.24	0.37	1475	0.000

```
sat 0406       300     123    15.67     0.46    1476    0.000
fri 0405      2701     201    56.28     0.74     268    0.000
```

Figure 37. Daily values as shown in report 200, Performance statistics (benchmark).

If you need *averages* only, use the report **Network benchmark statistics** (204).

```
CALL SUCCESS FACTORS
====================
SDCCH access probability
.      (before FCS) ............................/csf_1      100.00 %
.      (after FCS) .............................../csf_1a     100.00 %

SDCCH success ratio
.      (SDCCH fail based, incl.LU) ............./csf_2e       97.92 %
.      (SDCCH to TCH based) ..................../csf_2m       96.91 %

TCH access probability
.      (before DR and queuing) ................./csf_3m       99.91 %
.      (before DR) ............................./csf_3i       99.91 %
.      (real) .................................../csf_3l       99.91 %

TCH success ratio
.      (before re-est.) ......................../csf_4u       96.50 %
.      (after re-est) ........................../csf_4v       96.50 %

Note: See the formula descriptions for the accuracy limitations.
Note: For a cell level list, run report 250.
```

Figure 38. Averages as shown in report 204, Network benchmark statistics.

7.1 SDCCH drop ratio

Note that in SDCCH drops, most Abis failures are usually ghost RACH accesses.

7.1.1 SDCCH drop ratio on area level

For SDCCH drop ratio, run the report **Performance statistics (benchmark)** (200), and if interested in the averages and components, use the report **Network benchmark statistics** (204).

```
SDCCH failures
==============
SDCCH seizures ............................../trf_54        35492
SDCCH drop ratio ............................/sdr_1a         8.84 %
. SDCCH_RADIO_FAIL.........................../c1003           476  (    1.34 %)
. SDCCH_A_IF_FAIL_CALL......................./c1078            16  (    0.05 %)
. SDCCH_ABIS_FAIL_CALL......................./c1075          2644  (    7.45 %)
. SDCCH_USER_ACT............................./c1037             0  (    0.00 %)
. SDCCH_BCSU_RESET.........................../c1038             0  (    0.00 %)
. SDCCH_NETW_ACT............................./c1039             0  (    0.00 %)
. SDCCH_BTS_FAIL............................./c1036             0  (    0.00 %)
```


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```
. SDCCH_LAPD_FAIL............................/c1035           0  (   0.00 %)
. SDCCH_RF_OLD_HO........(HO drop)............/c1004           0  (   0.00 %)
. SDCCH_ABIS_FAIL_OLD....(HO drop)............/c1076           0  (   0.00 %)
. SDCCH_A_IF_FAIL_OLD....(HO drop)............/c1079           0  (   0.00 %)
```

Figure 39. Averages and components of SDCCH failures as shown in report 204, Network benchmark statistics.

7.1.2 SDCCH drop ratio on BTS hit list

For SDCCH drop ratios per cell, run the report **SDCCH drop ratio per cell** (166).

```
===============================================================================
=
=                   SDCCH DROP RATIO PER CELL
=
=                   Network:            XXX
=                   Area:               BSC - BSC11
=                   Period:             from 20000221 to 20000301
=                   Threshold:          SDCCH bids >= 100
=                   Threshold:          SDCCH drop ratio >=          2 %
=
===============================================================================


The detailed report gives the following figures sorted out by drop-out ratio
for all cells:

Drops total     /sdr_1a  Ratio of SDCCH drops/SDCCH bids.
SDCCH Bids      /trf_30  SDCCH assignments and SDCCH HO seizures.
SDCCH Ghosts    /rach_6  Ghost requests rejected by BSC due to illegal
.                        estabishment cause.
.                        The real amount of ghosts is about 8/3*counter3030
.                        in GSM ph.1!
Ghost (%)       /sdr_3b  SDCCH ghost requests in ratio to SDCCH bids

SDCCH Drop ratio (in ratio to SDCCH bids):
Rf (%) call      /c1003  Drops due to Radio failure during call
Rf (%) old       /c1004  Drops due to Radio failure in HO
A bis (%) call   /c1075  Drops due to 'Abis' failure during call
.                        (e.g. Ghosts having legal establishment cause)
A bis (%) old    /c1076  Drops due to 'Abis' failure in HO
Aif (%) call     /c1078  Drops due to 'Aif' failure during call
Aif (%) old      /c1079  Drops due to 'Aif' failure in HO
Lapd (%)         /c1035  Drops due to Lapd problems
BTS (%)          /c1036  Drops due to BTS problems
User (%)         /c1037  Drops due to user actions
BCSU (%)         /c1038  Drops due to BCSU reset
Cnfg act (%)     /c1039  Drops due to radio network configuration

Measurement used: p_nbsc_traffic, p_nbsc_res_access

Note: This report covers calls in the SDCCH phase.

Note: Phantom seizures having a legal establishment cause are included in the
.     the number of SDCCH attempts, and the failure ratio for calls is therefore
.     worse than in reality. Especially in the low-traffic cells the SDCCH
.     failure ratio gets high due to the phantoms. The number of rejected
.     phantom seizures is shown separately.

Note: SDCCH bids are not only calls but also LUs, SMSs, IMSI detaches, etc.
```

```
Note: Running this report takes a while. Patience please.

===============================================================================

                              SDDCH drops per cell
                            from 20000221 to 20000301

                                    A
                   Rf     bis    Aif                                    SDCCH
                   (%)    (%)    (%)                                    *******
BTS                ****   ****   ****   Lapd   Usr    Cfg    Drops Bids
BCF                call   call   call   BTS    BCSU   act    total Ghosts
BSC (BTSid)        old    old    old    (%)    (%)    (%)      (%) Ghost(%)
------------------ ------ ------ ------ ------ ------ ------ ----- ---------
H032RRG1              0.0    6.7   93.2    0.0    0.0    0.0   100       556
 1298_H032RRG         0.0    0.0    0.0    0.0    0.0                     18
 BSC11 (25)                                                           3%

Techpark55            0.2   90.7    0.0    0.0    0.0    0.0    91       428
 50032_Techpark5      0.0    0.0    0.0    0.0    0.0                    168
 BSC11 (164)                                                         39%

Techpark88            0.2   84.8    0.0    0.0    0.0    0.0    85       580
 50031_Techpark8      0.0    0.0    0.0    0.0    0.0                    187
 BSC11 (163)                                                         32%
```

Figure 40. Report 166: SDCCH drop ratio per cell

7.1.3 SDCCH drop ratio on BTS level

For SDCCH drop ratios on the BTS level, run the report **Cell analyser** (216).

```
SDCCH DROP RATIO ........................../sdr_1a      8.76 %       13.64 %

.               SDCCH drop ratio components:
.                     SDCCH_RADIO_FAIL....../c1003      1.20 %        0.00 %
.                     SDCCH_A_IF_FAIL_CALL../c1078      0.00 %        0.00 %
.                     SDCCH_ABIS_FAIL_CALL../c1075      7.57 %       13.64 %
.                     SDCCH_USER_ACT......../c1037      0.00 %        0.00 %
.                     SDCCH_BCSU_RESET....../c1038      0.00 %        0.00 %
.                     SDCCH_NETW_ACT......../c1039      0.00 %        0.00 %
.                     SDCCH_BTS_FAIL......../c1036      0.00 %        0.00 %
.                     SDCCH_LAPD_FAIL......./c1035      0.00 %        0.00 %

.                     SDCCH_RF_OLD_HO......./c1004      0.00 %        0.00 %
.                     SDCCH_ABIS_FAIL_OLD.../c1076      0.00 %        0.00 %
.                     SDCCH_A_IF_FAIL_OLD.../c1079      0.00 %        0.00 %

.               Timer T3101 expired (S7) ../c57020      7.97 %        9.09 %
************************************************************************
SDCCH Success Ratio, setup from SDCCH to TCH   (csf_2i)
BSC1KUTOJA      BTS:20 SANDPD1020      BCF:SANDPD010
************************************************************************

-1 = dividor was zero and ratio could not be counted

Hints: For BTS level hit list run the report 250.

     fri    sat    sun    mon    tue    wed    thu    fri    sat    sun    mon
      10     11     12     13     14     15     16     17     18     19     20
Hr   SEP    SEP    SEP    SEP    SEP    SEP    SEP    SEP    SEP    SEP    SEP
```

```
-- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
00
01
02
03
04
05
06
07                                        100    50
08   100                   100                   -1
09   100                    -1   100   100   133               100
10   100             100    33   100    -1   100               100
11    78                   100         100    86
12    75                   100    33   100   100   100
13    88             100   100   100    86    -1
14    85             150         100    50          -1   100   100
15    -1             100   100          71               100
16   100              -1                -1                      -1
17                                                 100
18
19
20
21
22
23
-
```

Figure 41. BTS level data on SDCCH drop ratio as shown in report 216, Cell analyser.

7.2 TCH drop call ratio

7.2.1 TCH drop call ratio on area level

For daily averages of TCH drop call ratio on area level, use the report **Performance statistics (benchmark)** (200). See also TCH success ratio and TCH drop ratio above.

For averages and components, run the report **Network benchmark statistics** (204).

```
TCH failures
============
TCH drop call ratio after TCH seizure
. before re-establisment...................../dcr_3i         3.50 %
.  TCH_RADIO_FAIL............................/c1013           59  (   2.68 %)
.  TCH_ABIS_FAIL_CALL........................./c1084            4  (   0.18 %)
.  TCH_A_IF_FAIL_CALL......................../c1087            0  (   0.00 %)
.  TCH_TR_FAIL.............................../c1029            1  (   0.05 %)
.  TCH_USER_ACT............................../c1048            0  (   0.00 %)
.  TCH_BCSU_RESET............................/c1049            0  (   0.00 %)
.  TCH_NETW_ACT............................../c1050            0  (   0.00 %)
.  TCH_ACT_FAIL_CALL........................./c1081            0  (   0.00 %)
.  TCH_BTS_FAIL............................../c1047            0  (   0.00 %)
.  TCH_LAPD_FAIL............................./c1046            0  (   0.00 %)
.  TCH_RF_OLD_HO.......(HO drop)............../c1014           13  (   0.59 %)
.  TCH_ABIS_FAIL_OLD...(HO drop)............../c1085            0  (   0.00 %)
.  TCH_A_IF_FAIL_OLD...(HO drop)............../c1088            0  (   0.00 %)
```

```
.  TCH_TR_FAIL_OLD.....(HO drop).............../c1030          0  (   0.00 %)
. after re-establisment....................../dcr_3j        3.50 %

T3101 expired (S9) ........................../c57038          0  (   0.00 %)
. (denominator in % calculation is same as above)

Note: For a cell level list, run report 163.
```

Figure 42. Averages and components of TCH failures as shown in report 204, Network benchmark statistics.

For the division of the dropped calls into categories and their daily values, run the report **TCH drop call statistics by days across area** (160).

```
===============================================================================

=
=                   TCH DROP CALL STATISTICS BY DAYS ACROSS AREA
=
=                   Network:            PLMN
=                   Area:               All BTSs selected
=                   Period:             from 19990907 to 19990908
=
===============================================================================

Calls:
normal                  /trf_55  TCH seizures for normal new call.
DR                   /dr_4+dr_5  Calls started as Directed Retry handover.
.                                It's the sum of DR in and intra-cell sdcch-tch ho.
FCS                      /c1099  TCH seizures due to FACCH call setup.

Re-establishment:
SDCCH                   /c57022  SDCCH assignments for re-establishment
TCH                     /c57032  TCH assignments for re-establishment

Different drop ratios in % (in ratio to sum of calls and re-establishments):
Rf call                  /c1013  Radio failures during call
Rf old                   /c1014  Radio failures on old channel failure in HO
Tr call                  /c1029  Transcoder failure during call
Tr old                   /c1030  Transcoder failures on old channel during HO
Abis call                /c1084  Abis failures during call.
Abis old                 /c1085  Abis failures on old channel during TCH HO.
Aif call                 /c1084  A if failures during call.
Aif old                  /c1085  A if failures on old channel during TCH HO.
Lapd                     /c1046  Lapd failures
BTS                      /c1047  Transaction failures due to BTS problems.
User                     /c1048  Transaction failures due to user actions.
BCSU                     /c1049  Transaction failures due to BCSU reset.
Cnfg                     /c1050  Transaction failures due to radio network
.                                configuration actions.
Act                      /c1081  Channel activation failures during call.
DCR                      /dcr_3c Ratio of the TCH call drops to started calls,
.                                (call re-est. is not considered)
DCR                      /dcr_3j Ratio of the TCH call drops to started calls,
.                                (call re-est. is considered)

Measurement used: p_nbsc_traffic, p_nbsc_ho, p_nbsc_service

Note: This report covers the calls after a successful TCH seizure attempt.
Note: The rounding causes that the drop call ratio does not necessarily exactly
.     match the sum of composite drop call ratios.

Note: Running this report takes a while. Patience please.
```

```
================================================================================

                              Drop call statistics

      Calls            Rf    Abis  Tr    Aif   (%)   (%)
     ******           (%)   (%)   (%)   (%)   ****  ****  DCR(%)
     normal    Re-est ***** ***** ***** ***** Lapd  User  ******
       DR      SDCCH  call  call  call  call  BTS   Cnfg  dcr_3m
MMDD   FCS      TCH   old   old   old   old   BCSU  Act   dcr_3j
---- --------- -------- ----- ----- ----- ----- ----- ----- ------
0907       939        0   4.5   0.1   1.7   0.0   0.0   0.0    8.3
             0        0   2.0   0.0   0.0   0.0   0.0   0.0    8.3
             0                                  0.0   0.0

0908       652        0   3.8   0.5   8.1   0.0   2.3   0.0   17.0
             0        0   2.0   0.0   0.2   0.0   0.2   0.0   17.0
             0                                  0.0   0.0
```

Figure 43. Report 160: TCH drop call statistics by days across area

7.2.2 TCH drop call ratio on BSC level

Transcoder failures are often BSC-specific. The report **TCH drop call statistics per day in each BSC** (162) helps to reveal the BSC dependency.

```
================================================================================
=
=                   TCH DROP CALL STATISTICS PER DAY IN EACH BSC
=
=                   Network:            PLMN
=                   Period:             from 19990907 to 19990908
=
================================================================================


Calls:
normal                /trf_55  TCH seizures for normal new call.
DR                 /dr_4+dr_5  Calls started as Directed Retry handover.
.                              It's the sum of DR in and intra cell sdcch-tch ho.
FCS                    /c1099  TCH seizures due to FACCH call setup.

Re-es:
SDCCH                  /c57022  SDCCH assignments for re-establishment
TCH                    /c57032  TCH assignments for re-establishment

Different drop ratios in % (in ratio to sum of calls and re-establishments):
Rf call                /c1013  Radio failures during call
Rf old                 /c1014  Radio failures on old channel failure in HO
Tr call                /c1029  Transcoder failure during call
Tr old                 /c1030  Transcoder failures on old channel during HO
Abis call              /c1084  Abis failures during call.
Abis old               /c1085  Abis failures on old channel during TCH HO.
Aif call               /c1084  A if failures during call.
Aif old                /c1085  A if failures on old channel during TCH HO.
Lapd                   /c1046  Lapd failures
BTS                    /c1047  Transaction failures due to BTS problems.
User                   /c1048  Transaction failures due to user actions.
```

```
BCSU                    /c1049  Transaction failures due to BCSU reset.
Cnfg                    /c1050  Transaction failures due to radio network
.                               configuration actions.
Act                     /c1081  Channel activation failures during call.

DCR                    /dcr_3m  Ratio of the TCH call drops to started calls,
.                               (before impact of call re-establishment)
DCR                    /dcr_3j  Ratio of the TCH call drops to started calls,
.                               (after impact of call re-establishment)

Measurement used: p_nbsc_traffic, p_nbsc_ho

Note: This report covers the calls after a successful TCH seizure attempt.
Note: The rounding causes that the drop call ratio does not necessarily exactly
.     match the sum of composite drop call ratios.

Note: Running this report takes a while. Patience please.


===============================================================================


                    Drop call statistics per day in each BSC
                                 BSC : BSC1KUTOJA

       Bids              Rf    Abis  Tr    Aif   (%)   (%)
      *****    Re-est   (%)   (%)   (%)   (%)   ***** ***** DCR(%)
      normal   *****    ***** ***** ***** ***** Lapd  User  ******
        DR     SDCCH    call  call  call  call  BTS   Cnfg  dcr_3m
MMDD   FCS      TCH     old   old   old   old   BCSU  Act   dcr_3j
---- -------- -------- ----- ----- ----- ----- ----- ----- ------
0908      109        0   0.9   0.0   0.0   0.0   0.0   0.0   1.8
            0        0   0.0   0.0   0.0   0.0   0.9   0.0   1.8
            0                                    0.0   0.0

0907      151        0   5.3   0.0   0.0   0.0   0.0   0.0  11.3
            0        0   6.0   0.0   0.0   0.0   0.0   0.0  11.3
            0                                    0.0   0.0


                    Drop call statistics per day in each BSC
                                  BSC : BSC2UPS1

       Bids              Rf    Abis  Tr    Aif   (%)   (%)
      *****    Re-est   (%)   (%)   (%)   (%)   ***** ***** DCR(%)
      normal   *****    ***** ***** ***** ***** Lapd  User  ******
        DR     SDCCH    call  call  call  call  BTS   Cnfg  dcr_3m
MMDD   FCS      TCH     old   old   old   old   BCSU  Act   dcr_3j
---- -------- -------- ----- ----- ----- ----- ----- ----- ------
0907        1        0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
            0        0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
            0                                    0.0   0.0
```

Figure 44.   Report 162: TCH drop call statistics per day in each BSC

7.2.3 TCH drop call ratio on BTS hit list

For TCH drop call ratios on BTS hit lists, run the report **Cells having high TCH drop call ratio** (163).

```
===============================================================================

=
=                   CELLS HAVING HIGH TCH DROP CALL RATIO
=
=                   Network:   PLMN
=                   Area:      All BTSs selected
=                   Period:    from 19990907 to 19990908
=                   Formula:   DROP CALL RATIO (dcr_3m)
=                   Threshold: DROP CALL RATIO >=         0  %
=                   Threshold: Nbr of TCH seizures (HO+call) >=          0
=                   Sorted by: DROP CALL RATIO
=
===============================================================================

The report gives the following figures sorted out by the selected column
for all cells meeting the thresholds:

Bids:
Call            /trf_55  Successful normal TCH call seizures (not DR nor FCS)
DR           /dr_4+dr_5  Calls started as Directed Retry handover.
.                        It is the sum of incoming and intracell SDCCH-TCH HO.
FCS              /c1099  TCH seizures due to FACCH call setup
T-T HO    /c4043+c4056  TCH seizures in MSC and BSC controlled incoming
.                        TCH-TCH handovers

Re-es:
SDCCH          /c57022  SDCCH assignments for re-establishment
TCH            /c57032  TCH assignments for re-establishment

Different drop ratio in % (---- means 0 divisor):
Rf call          /c1013  Radio failures
Rf old           /c1014  Radio failures on old channel in HO
Tc fail          /c1029  Transcoder failures.
Tc old           /c1030  Transcoder failures of old channel in HO
Abis call        /c1084  Abis failures.
Abis old         /c1085  Abis failures on old chn. in HO
Aif call         /c1087  A if failures.
Aif old          /c1088  A if failures on old chn. in HO
Lapd             /c1046  Lapd failuress.
BTS              /c1047  BTS failures.
Usr              /c1048  Failures due to user actions.
BCSU             /c1049  Failures due to BCSU reset.
Cfg              /c1050  Failures due to radio network
.                        configuration action.
Act              /c1081  Failures due to channel activation nack


Drop Ratio       /dcr_3m Drops per bids
.                        (bids = calls + DR in/intra + FCS)
Drop Ratio       /dcr_4e Drops per bids
.                        (bids = calls + DR in/intra + FCS + T-T HO)
Drop Ratio       /dcr_4f Drops per bids
.                        (bids = calls+ DR in/intra+ FCS+ netto TCH HO in- DAC)
Drop Ratio      /dcr_10b (Drops-re_establishments) per Erlang hour.

Measurement used: Traffic, Handover, Service, Res. Avail.

Note: This report covers the calls after a successful TCH seizure attempt.

Note: Running this report takes a while. Patience please.

===============================================================================

                      TCH DROP CALL RATIO (dcr_3m) per cell
                          between 19990907 and 19990908

                    Bids
```

```
                       *****             Rf      Tr    Abis     Aif    (%)   (%)
                        Call  Re-es     (%)     (%)     (%)     (%)   ****  ****   Drop
BTS                       DR  *****   *****   *****   *****   *****   Lapd  User  Ratio
 BCF                     FCS  SDCCH    call    call    call    call    BTS  Cnfg    (%)
 BSC (BTSid)          T-T HO    TCH     old     old     old     old   BCSU   Act dcr_3m
----------------- ------ ------ ------ ------ ------ ------ ----- ----- ------
SANDPD1019                34      0    14.7     0.0     0.0     0.0    0.0   0.0   41.2
 SANDPD010                 0      0    23.5     0.0     0.0     0.0    2.9   0.0
 BSC1KUTOJA (19)           0                                           0.0   0.0
                          31

5HERMIA3C                 47      0    10.6     2.1     0.0     0.0    6.4   0.0   27.7
 HERMIA002                 0      0     6.4     2.1     0.0     0.0    0.0   0.0
 BSC4TRE (5)               0                                           0.0   0.0
                          98

7HERMIA3A                232      0     7.8    17.7     0.0     0.0    0.9   0.0   27.6
 HERMIA003                 0      0     1.3     0.0     0.0     0.0    0.0   0.0
 BSC4TRE (7)               0                                           0.0   0.0
                         117
```

Figure 45. Report 163: Cells having high TCH drop call ratio

7.2.4 TCH drop call ratio on BTS level

To receive the average over a period, the busy hour and 10-day/24-hour breakdown, run the report **Cell analyser** (216).

```
TCH drop out ratio ......................../dcr_10     19.05 %        0.00 %

.               Drop call ratio components:
.                     TCH_RADIO_FAIL......../c1013      4.76 %        0.00 %
.                     TCH_ABIS_FAIL_CALL..../c1084      0.00 %        0.00 %
.                     TCH_A_IF_FAIL_CALL..../c1087      0.00 %        0.00 %
.                     TCH_TR_FAIL.........../c1029      0.00 %        0.00 %
.                     TCH_LAPD_FAIL........./c1046      0.00 %        0.00 %
.                     TCH_BTS_FAIL........../c1047      0.00 %        0.00 %
.                     TCH_USER_ACT........../c1048      0.00 %        0.00 %
.                     TCH_BCSU_RESET......../c1049      0.00 %        0.00 %
.                     TCH_NETW_ACT........../c1050      0.00 %        0.00 %
.                     TCH_ACT_FAIL_CALL...../c1081      0.00 %        0.00 %

.                     TCH_RF_OLD_HO........./c1014     14.29 %        0.00 %
.                     TCH_ABIS_FAIL_OLD...../c1085      0.00 %        0.00 %
.                     TCH_A_IF_FAIL_OLD...../c1088      0.00 %        0.00 %
.                     TCH_TR_FAIL_OLD......./c1030      0.00 %        0.00 %

Drops per erlang, before re-establishment  /dcr_10     19.05          0.00
Drops per erlang, after re-establishment  /dcr_10b     19.05          0.00
************************************************************************
Dropout ratio (%)           (dcr_10)
BSC1KUTOJA      BTS:20 SANDPD1020      BCF:SANDPD010
************************************************************************

-1 means that there were no calls

Hints: For BTS level hit list run the report 163.

     fri   sat   sun   mon   tue   wed   thu   fri   sat   sun   mon
      10    11    12    13    14    15    16    17    18    19    20
Hr   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP
-- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
00    -1                -1    -1
```

01	-1	-1	-1						
02	-1	-1	-1						
03	-1	-1	-1						
04	-1	-1	-1						
05	-1	-1	-1						
06	-1	-1	-1	-1	-1	-1	-1	-1	-1
07	-1	-1	-1	-1	-1	0	-1	-1	-1
08	400	-1	0	-1	-1	0	-1	-1	-1
09	9692	-1	0	0	0	0	-1	-1	-1
10	#####	0	0	316	0	3000	-1	-1	0
11	1125	-1	126	-1	-1	0	-1	-1	-1
12	0	-1	0	4500	0	0	-1	-1	-1
13	0	0	0	0	0	0	-1	-1	-1
14	4909	0	-1	0	242	-1	0	#####	0
15	0	0	0	-1	1200	-1	-1	#####	-1
16	0	0	-1	-1	0	-1	-1	-1	-1
17	-1	-1	-1	-1	-1	-1	0	-1	-1
18	-1	-1	-1	-1	-1	-1	-1	-1	-1
19	-1	-1	-1	-1	-1	-1	-1	-1	-1
20	-1	-1	-1	-1	-1	-1	-1	-1	-1
21	-1	-1	-1	-1	-1	-1	-1	-1	-1
22	-1	-1							
23	-1	-1							

Figure 46. Averages of TCH drop call ratio over a period of time in report 216, Cell analyser.

7.2.5 TCH observation

Depending on the dominating failure class (Abis, for example), it may be necessary to set the cell under observation. You can quickly analyse the observation data by using the report **SDCCH, TCH and BSC out HO observation statistics** (217).

This report helps you identify the actual point of failure in the message flow as defined by the phase and cause.

==

TCH observations Statistics

BSC/BCF/BTS	BTS nbr	TRX nbr	TSL nbr	Phase OUT	Cause OUT	Cause OUT count
BSC1KUTOJA KUTOJA001 KUTOJA1001	1	1	3	Release	43	1
			4	Release	43	1
			5	Release	42	1
		2	2	Release	43	1
			3	Release	43	1
			4	Release	43	1
			7	Release	43	1
BSC1KUTOJA KUTOJA001 KUTOJA1002	2	4	5	Release	43	1

```
      6    1 Internal HO inter, SDCCH      43       1
             or TCH source
```

Figure 47. Report 217: SDCCH, TCH and BSC out HO observation statistics

7.2.6 Drop call trace

If the BSS optional feature BSS8121 'Trace Window for Dropped Calls' is available, it is possible to put a suspicious cell (found by report 163) under drop call trace and get the details of the last seconds of the call before the drop recorded and sent automatically to Nokia NetAct.

The **Drop call trace** (225) report can then be used to analyse the data related to the drops of a particular cell. This report pulls together all drops related to the selected cell and gives the overview and the details.

```
===============================================================================

=
=                   DROP CALL TRACE
=                   BSC:       BSC4TRE
=                   BCF   :    1800_3Ail (         3)
=                   BTS   :    7HERMIA3A (         7)
=                   Period:    from 20001015 to 20001116
=
===============================================================================

This report gives drop call details for the selected BTS over the given time
period and contains the following parts:

Part 1:
Configuration of the BTS
Gives necessary generic info

Part 2:
Dropped calls summary
Gives overview.

Part 3:
Drop call trace
Gives details that are helpful in troubleshooting.
Data is organised in order of the tracing reference. Each trace is an individual
drop.

For the 'cause in'  and 'cause out' values is see the  BSC document
Call Related Dx Causes in BSC. Some common values  are shown a name.

MS speed field has meaning only if the related feature is in use.
Therefore the field is not shown if the value is 255 (obsolete)

For UL and DL data is shown only if (qual+lev>0). This condition is added to
filter out a dummy record that has no meaning.

For Uplink the following is reported for last 10 samples out of 32 (23 to 32):
Q   quality    in Bit Error Rate % (GSM 05.08)
L   level      0..63 (GSM 05.08)
DTX            0=not used, 1=used

For Downlink the following is reported for last 10 samples out of 32 (23 to 32):
Q   quality    in Bit Error Rate % (GSM 05.08)
L   level      0..63 (GSM 05.08)
```

```
Note that DL data is under investigation since the data fields are empty

Measurement used: p_nbsc_dc_obs (optional feature Drop Call Trace Window
.                 in BSC)

===============================================================================

                            Part 1: BTS configuration
               **************************************************

                                                     CHN ADM.    CHN
TRX        STATE         ALARMS             FRQ CHN STATE        TYPE
---------- ------------- ---------------- ----- --- ----------  ----------
1          Unlocked      No active alm      776 0   Unlocked    TCHF
                                                1   Unlocked    TCHF
                                                2   Unlocked    TCHF
                                                3   Unlocked    TCHF
                                                4   Unlocked    TCHF
                                                5   Unlocked    TCHF
                                                6   Unlocked    TCHF
                                                7   Unlocked    TCHF
2          Unlocked      No active alm      770 0   Unlocked    MBCCHC
                                                1   Unlocked    SDCCB
                                                2   Unlocked    TCHF
                                                3   Unlocked    TCHF
                                                4   Unlocked    TCHF
                                                5   Unlocked    TCHF
                                                6   Unlocked    TCHF
                                                7   Unlocked    TCHF


                              Part 2: Drops summary
               **************************************************

Phase Phase              Cause Cause
  out out                  out out                              COUNT
----- ------------------ ----- ------------------------- ----------
   11 Internal HO inter,   507 ms_is_lost                          5
      SDCCH or TCH source

   14 Internal HO inter,   511 source_fail                         1
      SDCCH or TCH target

   15 Conversation         317 conn_fail_rad_link_fail            23
   15 Conversation         318 conn_fail_rem_trans_fail            1
   15 Conversation         320 radio_interface_failure            15
   15 Conversation         365 conf_change_ms_fail_c               1

Total number of drops =         46


                        Part 3: Drop Call Trace. ref:178
               **************************************************

TCH TRX:2 TSL:3 Subch:0      2000-10-27  12:47:28
    BS pwr atten:  -2dB
    MS classm. pwr lev.: 30dBm
    MS pwr atten.:       -8dB
    Distance:             0.00km


    Phase in:      3 (Basic assignment)
    Cause in:      43
    Phase out:     15 (Conversation)
    Cause out:     320 (radio_interface_failure)
    End indication:Internal timer expires
```

```
UL  2000-10-27  12:47:28
          Qual  Lev DTX
    32:    0.1   38 1
    31:    0.1   38 1
    30:    0.1   38 1
    29:    0.1   39 1
    28:    0.1   38 1
    27:    0.1   38 1
    26:    0.1   38 1
    25:    0.1   38 1
    24:    0.1   38 1
    23:    0.1   38 1

                        Part 3: Drop Call Trace. ref:189
             **************************************************

TCH TRX:1 TSL:2 Subch:0      2000-10-27  13:06:37
    BS pwr atten:  -16dB
    MS classm. pwr lev.: 30dBm
    MS pwr atten.:       -12dB
    Distance:             0.55km


    Phase in:       3 (Basic assignment)
    Cause in:       43
    Phase out:      15 (Conversation)
    Cause out:      317 (conn_fail_rad_link_fail)
    End indication:Error Indic.


UL  2000-10-27  13:06:22
          Qual  Lev DTX
    32:   18.1    0 1
    31:    0.1   25 1
    30:    0.1   24 1
    29:    0.1   24 1
    28:    0.1   27 1
    27:    0.1   28 1
    26:    0.1   30 1
    25:    0.1   34 1
    24:    0.1   31 1
    23:    0.1   25 1
```

Figure 48. Report 225:Drop call trace

7.3 Handover failure ratio

BSS Network Doctor provides a variety of reports to monitor handover failure ratio at various network levels.

7.3.1 Handover failure ratio on BTS area level

For daily averages of handover failure ratios on a BTS area, use the report **Performance statistics (benchmark)** (200).

```
 TCH     TCH
                          TCH      HO      HO
              TCH          HO    seiz    seiz
               HO       block      qd   nonqd
              req         (%)     (%)     (%)
Day MMDD    ho_14b     blck_11c   que_2   que_8
--- ---- --------- --- -------- ------- -------
tue 1121       566 ==>     0.00    0.00  100.00
mon 1120       511 ==>     0.00    0.00  100.00
sun 1119        22 ==>     0.00    0.00  100.00
-
===============================================================================
=                Network Performance Statistics, Handover
===============================================================================

HO STATISTICS: (S-S = SDCCH-SDCCH, S-T = SDCCH-TCH, T-T=TCH-TCH)

MSC CONTROLLED OUTGOING HO SUCCESS BY HO TYPES
==============================================

             S-S     S-S      S-T     S-T      T-T     T-T
             att    succ      att    succ      att    succ
                     (%)              (%)              (%)
Day MMDD   c4054   hsr_1    c4050   hsr_2    c4052   hsr_3
--- ---- ------- ------- -------- ------- -------- -------
tue 1121       0    0.00        0    0.00        3  100.00
mon 1120       0    0.00        0    0.00       15  100.00
sun 1119       0    0.00        0    0.00        0    0.00


BSC CONTROLLED OUTGOING HO SUCCESS BY HO TYPES
==============================================

             S-S     S-S      S-T     S-T      T-T     T-T
             att    succ      att    succ      att    succ
                     (%)              (%)              (%)
Day MMDD   c4069   hsr_4    c4077   hsr_5    c4067   hsr_6
--- ---- ------- ------- -------- ------- -------- -------
tue 1121       0    0.00        0    0.00      541   96.30
mon 1120       0    0.00        0    0.00      451   90.91
sun 1119       0    0.00        0    0.00       22  100.00


INTRA CELL HO SUCCESS BY HO TYPES
=================================

             S-S     S-S      S-T     S-T      T-T     T-T
             att    succ      att    succ      att    succ
                     (%)              (%)              (%)
Day MMDD   c4078   hsr_7    c4077   hsr_8    c4076   hsr_9
--- ---- ------- ------- -------- ------- -------- -------
tue 1121       0    0.00        0    0.00       25   72.00
mon 1120       0    0.00        0    0.00       49   91.84
sun 1119       0    0.00        0    0.00        0    0.00


MSC CONTROLED HO FAILURES
=========================

                                                           Wrong
                                                           Aif    Adj
                          Not    Return Call        End HO circ   cell
                   Block  allwd  to old clear End HO BSS    type   err
                HO (%)    (%)    (%)    (%)   (%)    (%)    (%)    (%)
Day MMDD       att hfr_29 hfr_30 hfr_31 hfr_32 hfr_33 hfr_34 hfr_35 hfr_36
--- ---- -------- ------ ------ ------ ------ ------ ------ ------ ------
tue 1121         3   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
mon 1120        15   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
```

```
sun 1119        0   0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00

BSC CONTROLED HO FAILURES
=========================

                                                                  Wrong
                                                                  Aif
                           Not    Return Call          End HO circ   Drop
                    Block  allwd  to old clear  End HO BSS    type   call
                 HO (%)    (%)    (%)    (%)    (%)    (%)    (%)    (%)
Day MMDD        att hfr_37 hfr_38 hfr_39 hfr_40 hfr_41 hfr_42 hfr_43 hfr_44
--- ---- -------- ------ ------ ------ ------ ------ ------ ------ ------
tue 1121      541   0.00   0.00   2.40   0.00   0.92   0.00   0.37   0.92
mon 1120      451   0.00   0.00   6.43   0.00   2.00   0.00   0.67   2.00
sun 1119       22   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00

INTRA CELL HO FAILURES
======================

                                                                  Wrong
                                                                  Aif
                           Not    Return Call   MS     BSS    circ   Drop
                    Block  allwd  to old clear  lost   probl  type   call
                 HO (%)    (%)    (%)    (%)    (%)    (%)    (%)    (%)
Day MMDD        att hfr_45 hfr_46 hfr_47 hfr_48 hfr_49 hfr_50 hfr_56 hfr_51
--- ---- -------- ------ ------ ------ ------ ------ ------ ------ ------
tue 1121       25   0.00   0.00   0.00   0.00  24.00   0.00   4.00  24.00
mon 1120       49   0.00   0.00   2.04   0.00   4.08   0.00   2.04   4.08
sun 1119        0   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
```

Figure 49. Daily averages of handover failure ratio in report 200, Performance statistics (benchmark).

For handover averages and components, use the report **Network benchmark statistics** (204).

```
HANDOVERS
=========

HO drop ratio ................................/hfr_68         1.85 %
Total HO failure .............................../hfr_2         3.84 %
. HO failure due to blocking ................./hfr_55         0.00 %

Outgoing MSC ctrl HO attempts ................../ho_9            2
.   Successes ................................/c4004            2  ( 100.00 %)
.   Failures ................................./hof_6a           0  (   0.00 %)
.     MSC ctrl ho not allowed ................/c4037            0  (   0.00 %)
.     Blocked ................................/c4055            0  (   0.00 %)
.     Return to old ........................../c4006            0  (   0.00 %)
.     End of HO  ............................./c4007            0  (   0.00 %)
.     End of HO BSS ........................../c4008            0  (   0.00 %)
.     Call clear ............................./c4041            0  (   0.00 %)
.     Wrong Aif circuit type ................./c4102            0  (   0.00 %)
.     Adjacent cell error ..................../c4100            0  (   0.00 %)

.   Drop calls (S7).........................../c4107            0  (   0.00 %)


Outgoing BSC ctrl HO attempts ................./ho_11          521
.   Successes ................................/c4014          504  (  96.74 %)
.   Failures ................................./hof_8a          17  (   3.26 %)
```

```
.      BSC ctrl ho not allowed ................/c4038           0  (    0.00 %)
.      Blocked ................................/c4072           0  (    0.00 %)
.      Return to old ........................../c4015          10  (    1.92 %)
.      End of HO  .............................../c4016          6  (    1.15 %)
.      End of HO BSS ............................/c4017          0  (    0.00 %)
.      Call clear ............................../c4042           1  (    0.19 %)
.      Wrong Aif circuit type ................../c4096           0  (    0.00 %)

.    Drop calls ................................/c4084           6  (    1.15 %)


Intra cell  HO attempts ......................./ho_24         180
.    Successes ................................/ho_27         170  (   94.44 %)
.    Failures ................................./hof_9          10  (    5.56 %)
.      Intra cell ho not allowed ............../c4036           0  (    0.00 %)
.      Blocked ................................/c4019           0  (    0.00 %)
.      Return to old ........................../c4022           3  (    1.67 %)
.      MS lost .(drop call)..................../c4020           7  (    3.89 %)
.      Radio chn.act.failure ................../c4021           0  (    0.00 %)
.      Call clear ............................./c4039           0  (    0.00 %)
.      Wrong Aif circuit type ................../c4098           0  (    0.00 %)

.    Drop calls ................................/c4085           7  (    3.89 %)

Note: For a cell level list, run report 150.
Note: For adjacency level list run report 153.

-
Causes:
UL quality................................../c4023           9  (    1.28 %)
UL level..................................../c4024         107  (   15.22 %)
DL quality................................../c4025          38  (    5.41 %)
DL level..................................../c4026         174  (   24.75 %)
Distance ..................................../c4027           0  (    0.00 %)
MSC invocation (traffic reason) ............../c4028           0  (    0.00 %)
UL interference ............................../c4029          17  (    2.42 %)
DL interference ............................../c4030         188  (   26.74 %)
Umbrella ..................................../c4031           0  (    0.00 %)
Pbdgt ......................................../c4032         170  (   24.18 %)
OMC (forced by user) ......................../c4033           0  (    0.00 %)
Directed retry ............................../c4079           0  (    0.00 %)
Pre-emption ................................./c4086           0  (    0.00 %)
Rapid field drop ............................/c4087           0  (    0.00 %)
Low distance ................................/c4088           0  (    0.00 %)
Bad CI ....................................../c4089           0  (    0.00 %)
Good CI ...................................../c4090           0  (    0.00 %)
Aif circuit type change (S5)................../c4099           0  (    0.00 %)
Slow moving MS (S5) ........................../c4091           0  (    0.00 %)
MS slow speed (S6) .........................../c4105           0  (    0.00 %)
MS high speed (S6) .........................../c4106           0  (    0.00 %)
Bad rxlev on super (S7)......................./c4109           0  (    0.00 %)
Good rxlev on reg (S7)......................../c4110           0  (    0.00 %)
Direct access (S7)............................/c4128           0  (    0.00 %)
Enhanced rapid field drop (S7)................/c4111           0  (    0.00 %)
BSC controlled TRHO (S8)....................../c4035           0  (    0.00 %)
DADLB (S8)..................................../c4129           0  (    0.00 %)
GPRS (S9)...................................../c4130           0  (    0.00 %)
HSCSD (S10)................................../c4141           0  (    0.00 %)

Note: For a cell level list, run report 154.
-

SHORT MESSAGES
==============

SDCCH SMS attempts ............................/sms_5        1099
. success ...................................../sms_3              (   99.91 %)
TCH SMS attempts ............................../sms_6           9
```

```
. success ..................................../sms_2            ( 100.00 %)

Note: For a cell level list, run report 132.
```

Figure 50. Handover averages and components as shown in report 204, Network benchmark statistics.

7.3.2 Handover failure ratio on BTS hit list level

Use the report **Cells having high HO failure ratio** (150) if only the standard measurements are available. It can be difficult to pinpoint the adjacency that is causing the failures.

```
===============================================================================

                              BTS HO failure rate
                         between 20010911 and 20010911
                           sorted by total HO fail %

                                                                          Tot
BTS                                        Tot                             HO
 BCF               Type        Att  Fail  Blck NotA Drop Other          Fail
 BSC (BTSid)                              %     %    %    %     %          %
----------------- ------------------------------------------------- ------
SIILO21            MSC i:        0   0.0   0.0    -  0.0   0.0          3.8
 SIILO007          MSC o:        0   0.0   0.0  0.0  0.0   0.0
 BSC7SALO(21)      BSC i:     2040   0.3   0.0    -  0.0   0.2
                   BSC o:     2167   3.5   0.0  0.0  0.1   3.4
                   Cell :       17   0.0   0.0  0.0  0.0   0.0

MONITORI11         MSC i:        0   0.0   0.0    -  0.0   0.0          1.6
 MONITORI004       MSC o:        0   0.0   0.0  0.0  0.0   0.0
 BSC7SALO(11)      BSC i:     1106   0.2   0.0    -  0.0   0.2
                   BSC o:     1132   1.4   0.0  0.0  0.0   1.4
                   Cell :        6   0.0   0.0  0.0  0.0   0.0
```

Figure 51. Report 150: Cells having high HO failure ratio

7.3.3 Handover failure ratio on adjacency hit list level

The **Adjacencies having high HO failure ratio** (153) report is based on the optional BSC measurement HO Adjacent Cell. You can use the thresholds to focus on problematic adjacencies only.

```
===============================================================================


                      Part 1: Adjacencies with HO failures
                          between 19980714 and 19980714

Source                                                         Target
******                                                         ******
BTS NAME            HO=>    HO=> HO=> <=HO <=HO <=HO    Target BTS NAME
BCF NAME            ****    **** **** **** **** ****    ****** BCF NAME
BSC NAME (BTS)      Att     Blck Fail Fail Blck Att     LAC    BSC NAME (BTS)
```

```
BAND                       (%)  (%)  (%)  (%)        CI     BAND
----------------- ------ ---- ---- ---- ---- ------ ------ ------------------
SANDPG1017             2   50  100    0    0      0 1      SANDPG1018
SANDPG009                                           10018  SANDPG009
BSC1 (17)                                                  BSC1 (18)
gsm900                                                     gsm900

HER3CG3007             3    0   67   67    0      3 3      HER3CG3007
HERMIA003                                           30007  HERMIA003
BSC3TRE (7)                                                BSC3TRE (7)
gsm900                                                     gsm900
```

Figure 52. Report 153: Adjacencies having high HO failure ratio

7.3.4 TRHO handovers (AMH)

```
================================================================================
=
=              TRHO handovers (AMH)
=
=              Network:            PLMN
=              Area:               All BTSs selected
=              Period:             from 20010427 to 20010427
=              Time aggregation:   whole period
=              Object aggregation: BTS
=
================================================================================

This report shows the counters related to Advanced Multilayer Handling for those
cells that have either TCH requests for a BSC controlled TRHO or HO attempts
to other cell due to BSC controlled TRHO.

TRHO req            c1167 TCH requests for a BSC controlled TRHO
TRHO seiz           c1168 Successful TCH seizures for BSC controlled TRHO
TRHO rej            c1169 Rejected TCH requests for a BSC controlled TRHO due
.                         to exceeded load in the target cell
TRHO att            c4035 HO attempts to other cell due to BSC controlled TRHO
.                         (triggered in source cell where as other counters
.                          are triggered in target cell)

Measurement used: Traffic, Handover

Note: Running this report takes a while. Patience please.

================================================================================


             !            !               !   !    TRHO!    TRHO!    TRHO!    TRHO
             !            !               !BTS!    req!    seiz!     rej!     att
BSC          !BCF         !BTS            !id !  c1167!   c1168!   c1169!   c4035
-------------!------------!---------------!---!--------!--------!--------!--------
BSC1KUTOJA   !KUTOJA001   !KUTOJATALKFAM1 !1  !       1!       1!       0!       0
BSC1KUTOJA   !KUTOJA001   !KUTOJATALKFAM2 !2  !       7!       6!       1!       0
```

Figure 53. Report 155: TRHO handovers (AMH)

7.3.5 DADLB handovers

```
===============================================================================
=
=              DADLB handovers
=              Network:            PLMN
=              Area:               BSC -   50264
=              Period:             from 20010703 to 20010703
=              Time aggregation:   whole period
=              Object aggregation: BTS
=
===============================================================================

This report shows the counters related to DADLB (Direct Access to Desired Layer
or band) per selected object level (area/BSC/BTS) and per selected time
aggregation (total/daily/hourly).


Cell as HO source:
DADLB start (src)     c1172 BTS load threshold is execeed and a HO is asked
DADLB HO att (src)    c4129 HO attempt started.

Cell as HO target:
DADLB succ seiz (tgt) c1170 Successful TCH seizures due to DADLB HO
DADLB rej (tgt)       c1171 TCH requests in DADLB HO rejected due to lack of TCH

Measurement used: Traffic, Handover

Note: Running this report takes a while. Patience please.

===============================================================================


             !           !                !   !        !   DADLB!   DADLB!
             !           !                !   !   DADLB!      HO!    succ!   DADLB
             !           !                !   !   start!     att!    seiz!     rej
             !           !                !BTS!   (src)!   (src)!   (tgt)!   (tgt)
BSC          !BCF        !BTS             !id !   c1172!   c4129!   c1170!   c1171
-------------!-----------!----------------!---!--------!--------!--------!--------
BSC1KUTOJA   !KUTOJA001  !KUTOJATALKFAM1  !1  !       1!       1!       0!       0
BSC1KUTOJA   !KUTOJA001  !KUTOJATALKFAM2  !2  !       0!       0!       2!       0
BSC1KUTOJA   !SUOSAA004  !SUOSAA1006      !6  !       0!       0!       0!       0
BSC1KUTOJA   !SUOSAA004  !SUOSAA1007      !7  !       0!       0!       0!       0
BSC1KUTOJA   !KILO007    !TKARA11         !11 !       0!       0!       0!       0
```

Figure 54. Report 156: DADLB handovers

7.3.6 Handover failure ratio on BTS level

For handover failure ratios on the BTS level, run the report **Cell analyser** (216).

```
===============================================================================
=                           Cell HO performance.
=                 BSC1KUTOJA      bts id:20  name:SANDPD1020
=                  from 19990917 to 19990920
===============================================================================
.                                                           Whole       TCH
.                                                           period      busy hour
.                                                           average     average
.                                                           =======     =========
```

```
HO failure ratio ........................../hfr_1      8.33 %        .00 %

HANDOVER ATTEMPTS

SDCCH-SDCCH................................/ho_18       0.0           0.0
. MSC controlled outgoing................../c4054       0.0           0.0
. MSC controlled incoming................../c4048       0.0           0.0
. BSC controlled outgoing................../c4069       0.0           0.0
. BSC controlled incoming................../c4061       0.0           0.0
. Intra cell.............................../c4078       0.0           0.0

SDCCH-TCH................................../ho_17       0.0           0.0
. MSC controlled outgoing................../c4053       0.0           0.0
. MSC controlled incoming................../c4047       0.0           0.0
. BSC controlled outgoing................../c4068       0.0           0.0
. BSC controlled incoming................../c4060       0.0           0.0
. Intra cell.............................../c4077       0.0           0.0

TCH-TCH..................................../ho_16       5.3           3.0
. MSC controlled outgoing................../c4052       0.5           2.0
. MSC controlled incoming................../c4046       1.1           2.0
. BSC controlled outgoing................../c4067       1.4           2.0
. BSC controlled incoming................../c4059       1.8           6.0
. Intra cell.............................../c4076       0.5           0.0


HANDOVER FAILURE RATIOS:
.
SDCCH-SDCCH
. MSC controlled outgoing.............../100-hsr_1        na %          na %
. MSC controlled incoming............../100-hsr_10        na %          na %
. BSC controlled outgoing.............../100-hsr_4        na %          na %
. BSC controlled incoming............../100-hsr_13        na %          na %
. Intra cell.........................../100-hsr_7        na %          na %

SDCCH-TCH
. MSC controlled outgoing.............../100-hsr_2        na %          na %
. MSC controlled incoming............../100-hsr_11        na %          na %
. BSC controlled outgoing.............../100-hsr_5        na %          na %
. BSC controlled incoming............../100-hsr_14        na %          na %
. Intra cell.........................../100-hsr_8        na %          na %
.
TCH-TCH
. MSC controlled outgoing.............../100-hsr_3      0.00 %        0.00 %
. MSC controlled incoming............../100-hsr_12      0.00 %        0.00 %
. BSC controlled outgoing.............../100-hsr_6      0.00 %        0.00 %
. BSC controlled incoming............../100-hsr_15      3.57 %        0.00 %
. Intra cell.........................../100-hsr_9     75.00 %          na %


-

HANDOVER FAILURES:
==================
.                                                      Whole         TCH
.                                                      period        busy hour
.                                                      average       average
.                                                      =======       =========

Outgoing MSC ctrl HO attempts .............../ho_9     0.5           2.0
.   Successes ........................./100-hfr_5   100.00 %      100.00 %
.   Failures ............................../hfr_5     0.00 %        0.00 %
.     MSC ctrl ho not allowed ............../c4037     0.00 %        0.00 %
.     Blocked ............................../c4055     0.00 %        0.00 %
```

```
.     Return to old ......................../c4006      0.00 %        0.00 %
.     End of HO  ........................../c4007      0.00 %        0.00 %
.     End of HO BSS ......................./c4008      0.00 %        0.00 %
.     Call clear ........................../c4041      0.00 %        0.00 %
.     Wrong Aif circuit type ............../c4102      0.00 %        0.00 %
.     Adjacent cell error ................./c4100      0.00 %        0.00 %

.   Drop calls ..................(planned in S7)

Outgoing BSC ctrl HO attempts ............../ho_11      1.4           2.0
.   Successes ........................./100-hfr_7    100.00 %      100.00 %
.   Failures ............................./hfr_7      0.00 %        0.00 %
.     BSC ctrl ho not allowed ............./c4038      0.00 %        0.00 %
.     Blocked ............................./c4072      0.00 %        0.00 %
.     Return to old ......................../c4015      0.00 %        0.00 %
.     End of HO  ........................../c4016      0.00 %        0.00 %
.     End of HO BSS ......................./c4017      0.00 %        0.00 %
.     Call clear ........................../c4042      0.00 %        0.00 %
.     Wrong Aif circuit type ............../c4096      0.00 %        0.00 %

.   Drop calls ............................/c4084      0.00 %        0.00 %

Incoming MSC ctrl HO attempts ............../ho_35      1.1           2.0
.   Successes .........................../hsr_17    100.00 %      100.00 %
.   Failures ........................./100-hsr_17      0.00 %        0.00 %
.     Blocked ............................./c4001      0.00 %        0.00 %
.     Connection failure ................../c4002      0.00 %        0.00 %
.     Radio chn. act. failure ............./c4003      0.00 %        0.00 %
.     End of HO ........................../c4080      0.00 %        0.00 %
.     Wrong Aif circuit type ............../c4101      0.00 %        0.00 %

Incoming BSC ctrl HO attempts ............../ho_10      1.8           6.0
.   Successes .........................../hsr_16     96.43 %      100.00 %
.   Failures ........................./100-hsr_16      3.57 %        0.00 %
.     Blocked ............................./c4011      0.00 %        0.00 %
.     Connection failure ................../c4012      3.57 %        0.00 %
.     Radio chn. act. failure ............./c4013      0.00 %        0.00 %
.     End of HO ........................../c4081      0.00 %        0.00 %
.     Wrong Aif circuit type ............../c4097      0.00 %        0.00 %

Intra cell HO attempts ..................../ho_24      0.5           0.0
.   Successes ......................./100-hfr_57     25.00 %          na %
.   Failures ............................/hfr_57     75.00 %          na %
.     Intra cell ho not allowed .........../c4036      0.00 %          na %
.     Blocked ............................./c4019      0.00 %          na %
.     Return to old ......................../c4022      0.00 %          na %
.     MS lost .(drop call)................./c4020     75.00 %          na %
.     Radio chn.act.failure ................/c4021      0.00 %          na %
.     Call clear ........................../c4039      0.00 %          na %
.     Wrong Aif circuit type ............../c4098      0.00 %          na %

.   Drop calls ............................/c4085     75.00 %          na %


-
HANDOVER CAUSES:
================
.                                                     Whole         TCH
.                                                     period        busy hour
.                                                     average       average
.                                                     =======       =========
.
Number of all ho attempts ................./ho_13d      3.5           6.0
.
Cause:
.  UL quality ............................../c4023     57.14 %      50.00 %
.  DL quality ............................../c4025      0.00 %       0.00 %
```

```
.  UL level ................................/c4024    42.86 %     50.00 %
.  DL level ................................/c4026     0.00 %      0.00 %
.  UL interference .........................../c4029     0.00 %      0.00 %
.  DL interference .........................../c4029     0.00 %      0.00 %
.  Distance ................................/c4027     0.00 %      0.00 %
.  MSC invocation (traffic reason) ........../c4028     0.00 %      0.00 %
.  Umbrella ................................/c4031     0.00 %      0.00 %
.  Power budget ............................/c4032     0.00 %      0.00 %
.  OMC (forced by user) ..................../c4033     0.00 %      0.00 %
.  Directed retry ........................../c4079     0.00 %      0.00 %
.  Pre-emption ............................./c4086     0.00 %      0.00 %
.  Field drop ............................../c4087     0.00 %      0.00 %
.  Low distance ............................/c4088     0.00 %      0.00 %
.  Bad C/I ................................./c4089     0.00 %      0.00 %
.  Good C/I ................................/c4090     0.00 %      0.00 %
.  Slow Moving MS ........................../c4091     0.00 %      0.00 %
.  Aif circuit type change ................./c4099     0.00 %      0.00 %
.  MS slow speed .........................../c4105     0.00 %      0.00 %
.  MS high speed .........................../c4106     0.00 %      0.00 %
.  Bad rxlev on super ....................../c4109     0.00 %      0.00 %
.  Good rxlev on regular .................../c4110     0.00 %      0.00 %
.  Direct access  ........................../c4128     0.00 %      0.00 %
.  Enhanced rapid field drop ................/c4111     0.00 %      0.00 %
.  BSC controlled TRHO (S8)................../c4035     0.00 %      0.00 %
.  DADLB (S8)................................/c4129     0.00 %      0.00 %
.  GPRS (S9)................................/c4130     0.00 %      0.00 %
.  HSCSD (S10)............................../c4141     0.00 %      0.00 %
```

Figure 55. BTS level handover failure ratios as shown in report 216, Cell analyser.

The report also shows the worst cases of failing adjacencies:

```
***********************************************************************

Adjacencies with HO failure ratio (hfr_58 or hfr_59) > 10%  or
HO blocking ratio(blck_19 or blck_20) > 10%
BSC1KUTOJA      bts:20 SANDPD1020      bcf:SANDPD010
***********************************************************************

Source                                                        Target
******                 HO=> HO=> <=HO <=HO             Target ******
BTS NAME        HO=>   **** **** **** **** <=HO        ****** BTS NAME
BCF NAME        ****   Blck Fail Fail Blck ****        LAC    BCF NAME
BSC NAME (BTS)  Att     (%)  (%)  (%)  (%) Att         CI     BSC NAME (BTS)
--------------- ------ ---- ---- ---- ---- ------ ------ ----------------
SANDPD1020           8    0   75   75    0      8 1      SANDPD1020
SANDPD010                                          10020  SANDPD010
BSC1KUTOJA                                                BSC1KUTOJA
(20)                                                      (20 )
```

Figure 56. The worst cases of failing adjacencies in report 216, Cell analyser.

The usage of all adjacencies and failures are seen also in report 213, **Cell doctor**:

```
===========================================================================
```

```
Source                                                       Target
******                                                       ******
BTS NAME                 HO=> HO=>        <=HO <=HO Target BTS NAME
BCF NAME            HO=> **** ****   <=HO **** **** ****** BCF NAME
BSC NAME           ***** Blck Fail  ***** Blck Fail LAC    BSC NAME
(BTS)                Att  (%)  (%)    Att  (%)  (%) CI     (BTS)
--------------- ------ ---- ---- ------ ---- ---- ------ ----------------
KUTOJA1002           3    0    0      1    0    0 1      KUTOJA1001
KUTOJA001                                         10001  KUTOJA001
BSC1KUTOJA                                               BSC1KUTOJA
(2)                                                      (1  )
```

Figure 57. Adjacencies and failures as shown in report 213, Cell doctor.

7.4 Location update success

7.4.1 Location update success on BSC level

Location update uses SDCCH and thus SDCCH success is an important contributor to LU success. If you need to focus on LU success separately, run report **Location update success ratio per BSC** (203).

```
===============================================================================

=
=                   LOCATION UPDATE SUCCESS RATIO PER BSC
=
=                   Network:            PLMN
=                   Period:             from 19970828 to 19970828
=
===============================================================================

LU attempts           c3019       Successful location update seizures.
LU success ratio      lsr_2       Successful location update ratio.

Measurement used: p_nbsc_cc_pm

===============================================================================

                            LU success
                                 ratio
BSC             LU attempts        (%)
--------------- ----------- ----------
NYC_BSC_1            333374       99.1
NYC_BSC_2            250703       98.9
NYC_BSC_3            195385       99.0
NYC_BSC_4            162084       98.8
NYC_BSC_5            152805       98.6
NYC_BSC_6            194406       98.7
```

Figure 58. Report 203: Location update success ratio per BSC

8 Cell dimensioning

There are many ways in which cell dimensioning can affect the quality of the network. The most severe case is that the user does not have access to the system.

8.1 Finding the existing dimensioning problems in the network

The following measurements help pinpoint problems in dimensioning:

- SDCCH congestion and blocking
- TCH congestion and blocking

Congestion means a situation when all resources are in use. Blocking is the situation when all resources are in use and new seizure attempts are rejected.

8.2 Finding the future dimensioning problems in the network

It is possible to estimate the growth of traffic in each cell so that the possible congestion is forecast months in advance. In some cases traffic increases steadily and it is possible to detect that the cell in question will have to be redimensioned. Sometimes the traffic increase occurs suddenly due to some event, new building, traffic jam or an accident.

Currently the BSS Network Doctor reports do not support the extrapolation of traffic.

8.3 SDCCH congestion and blocking

SDCCH congestion is a situation when all SDCCHs are in use simultaneously. BSS Network Doctor reports display the total time that the SDCCHs were in use simultaneously.

SDCCH blocking is a situation when all SDCCH channels are in use and a new seizure attempt is rejected due to the lack of resources. BSS Network Doctor reports display the percentage of rejected seizures out of all seizures.

8.3.1 SDCCH congestion and blocking on area level

For SDCCH congestion and blocking, BSS Network Doctor provides two reports:

- **Network benchmark statistics** (204)
- **Performance statistics (benchmark)** (200)

```
SDCCH requests ................................/c1000        35493
. HO in........................................./c1006            0  (    0.00 %)
. blocked ........................./blck_15 (blck_5a)            1  (    0.00 %)
. To FACCH call setup ........................./c1099            0  (    0.00 %)
. LU ........................................../c3019        28098  (   79.16 %)
. MTC (incl. SMS) ............................./c3012         1473  (    4.15 %)
. MOC (incl. SMS,SS) ........................../c3013         1944  (    5.48 %)
.   supplementary service request (S9) ......../c3044           62  (    0.17 %)
. IMSI detach (S7) ............................/c3033         1516  (    4.27 %)
. call re-establishment......................../c3020            0  (    0.00 %)
. emergency call ............................../c3021           12  (    0.03 %)
. other (fails, ghosts) ......................./sd_1a         2449  (    6.90 %)
```

Figure 59. SDCCH congestion and blocking as shown in report 204, Network benchmark statistics.

```
           SDCCH   SDCCH  SDCCH      SDCCH        SDCCH   SDCCH   SDCCH
           avail  congst  usage       seiz      HO seiz  assign   block  To FCS
             (%)   (min)    (%)        att          (%)     (%)     (%)     (%)
Day MMDD   ava_4  cngt_2 trf_7b      c1000       trf_33  trf_34 blck_5a  trf_38
--- ---- ------- ------- ------ --------- --- ------- ------- ------- -------
tue 0409   71.63     0.0    0.0      41834 ==>     0.00   99.98    0.02    0.00
mon 0408   72.62     0.0    0.0      36861 ==>     0.00  100.00    0.00    0.00
sun 0407   75.80     0.0    0.0      14106 ==>     0.00  100.00    0.00    0.00
sat 0406   70.12     0.0    0.0      16207 ==>     0.00  100.00    0.00    0.00
fri 0405   70.58     0.0    0.0      34648 ==>     0.00  100.00    0.00    0.00
```

Figure 60. SDCCH congestion and blocking as shown in report 200, Performance statistics (benchmark).

8.3.2 SDCCH congestion and blocking on BTS hit list

The report **Cells having SDCCH congestion** (130) shows BTSs and periods when congestion time has exceeded the given threshold.

```
================================================================================

=
=                    CELLS HAVING SDCCH CONGESTION
=
```

```
=                   Network:      PLMN
=                   Area:         BSC - BSC_SSSSS
=                   Period:       from 19970128 to 19970201
=                   Threshold1:   congestion >= 2   seconds
=                   Threshold2:   blocking >= 0  %
=
===============================================================================

This report shows each measurement period having SDCCH congestion
over a given threshold.

Aver avail SDCCH     /ava_3    Average available SDCCH
SDCCH cong (sec)     /cngt_2   Time congestion on SDCCH
SDCCH blck (% )      /blck_5   Blocking on SDCCH, before FCS
SDCCH blck (% )      /blck_5a  Blocking on SDCCH, after FCS
SDCCH req            /c1000    SDCCH seizure attempts

Measurement used: p_nbsc_res_avail, p_nbsc_traffic


Hints:
.             - SDCCH congestion may be caused by excessive nbr of LUs which
.               may occur easily if LAs are not planned well.

Running this report takes a few minutes. Patience please.

===============================================================================
                          BTS having SDCCH congestion
                         between 19970128 and 19970201

                                                                     SDCCH
                                                                     blck(%)
                                Period     Period  Aver        SDCCH *******
BSC             BCF name        start      start   avail SDCCH  cong blck_5
(BTS id)        BTS name        day        hour    SDCCH   req (sec) blck_5a
--------------- --------------- ---------- ------ ----- ----- ----- -------
BSC_SSSSS       102             1997-01-29 15:00    4.0    28     6   10.71
(46)            AEIWW                                                 10.71


BSC_SSSSS       110A            1997-01-30 17:00    4.0   123     2    0.00
(52)            AMBWW                                                  0.00

                                           20:00    4.0    99     4    1.01
                                                                       1.01


BSC_SSSSS       099             1997-01-30 10:00    4.0   104     2    0.96
(42)            AZBMM                                                  0.96


BSC_SSSSS       101C            1997-01-30 16:00    8.0    50     3    4.00
(63)            BK1MM                                                  0.00

                                           18:00    8.0    69     3    0.00
                                                                       0.00

                                1997-01-31 15:00    8.0    36     3    2.78
                                                                       2.78


BSC_SSSSS       051             1997-01-30 22:00    4.0    94     2    2.13
(14)            BN2QQ                                                  2.13

                                1997-02-01 06:00    4.0    18     4   11.11
                                                                      11.11
```

```
                                          17:00    4.0    80     3    1.25
                                                                      1.25
```

Figure 61. Report 130: Cells having SDCCH congestion

8.3.3 SDCCH congestion and blocking on BTS level

For SDCCH congestion and blocking on BTS level, use the report **Cell analyser** (216).

```
.
                               Whole       SDCCH
.                                                      period      busy hour
.                                                      average     average
.                                                      =======     =========
.
SDCCH requests ............................/c1000       3.9          22.0
. SDCCH requests BLOCKED .................../blck_5a     0.00 %        0.00 %
. SDCCH seizures for calls and LU ........../c1007    100.00 %      100.00 %
. SDCCH seizures for handovers ............./c1006      0.00 %        0.00 %

***********************************************************************
SDCCH congestion (seconds)        (cngt_2)
BSC1KUTOJA      BTS:20 SANDPD1020      BCF:SANDPD010
************************************************************************

     fri   sat   sun   mon   tue   wed   thu   fri   sat   sun   mon
      10    11    12    13    14    15    16    17    18    19    20
Hr   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP
-- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
00     0                 0     0
01     0                 0     0
02     0                 0     0
03     0                 0     0
04     0                 0     0
05     0                 0     0
06     0                 0     0     0     0     0     0     0     0
07     0                 0     0     0     0     0     0     0     0
08     0                 0     0     0     0     0     0     0     0
09     0                 0     0     0     0     0     0     0     0
10     0                 0     0     0     0     0     0     0     0
11     0                 0     0     0     0     0     0     0     0
12     0                 0     0     0     0     0     0     0     0
13     0                 0     0     0     0     0     0     0     0
14     0                 0     0     0     0     0     0     0     0
15     0                 0     0     0     0     0     0     0     0
16     0                 0     0     0     0     0     0     0     0
17     0                 0     0     0     0     0     0     0     0
18     0                 0     0     0     0     0     0     0     0
19     0                 0     0     0     0     0     0     0     0
20     0                 0     0     0     0     0     0     0     0
21     0                 0     0     0     0     0     0     0     0
22     0                 0
```

Figure 62. BTS level data on SDCCH congestion and blocking in report 216, Cell analyser.

8.4 TCH congestion and blocking

TCH congestion is a situation in which all TCHs are in use simultaneously. BSS Network Doctor reports display the total time that the TCHs were in use simultaneously.

TCH blocking is a situation when all TCH channels are in use and a new seizure attempt is rejected due to lack of resources. BSS Network Doctor reports display the percentage of rejected seizures out of all seizures. Blocking can be reduced by using the optional BSC features Directed Retry and Queuing.

8.4.1 TCH congestion on area level

For TCH congestion on the area level, use reports:

- **Network benchmark statistics** (204)
- **Performance statistics (benchmark)** (200)

```
TCH requests for new calls (trf_18a):
. DR handover to other cell
.    succ ....................................../dr_3            0  (    0.00 %)
.    unsucc ..................................../dr_7            0  (    0.00 %)
. DR handover intracell (IUO opt.)
.    succ ...................................../c4074           0  (    0.00 %)
.    unsucc ..................................../dr_8            0  (    0.00 %)
. To queue ..................................../c1016           2  (    0.09 %)
.    From queue to DR (S8)..................../c1173           0  (    0.00 %)
.    Unserved queued ........................./c1024           2  (    0.09 %)
. TCH normal seizures (queued or not) ......../trf_55        2198  (   99.91 %)
.    re-establishments (S7).................../c57032          0  (    0.00 %)
. Blocked calls ................../blck_9c (blck_8d)           2  (    0.09 %)
```

Figure 63. Area level data on TCH congestion in report 204, Network benchmark statistics.

```
                                 TCH          Succ      TCH      TCH      TCH
               TCH       TCH     call           DR     call     seiz     seiz
             avail    congst      req          out    block       qd   non qd
               (%)     (min)                   (%)      (%)      (%)      (%)
Day MMDD   ava_1d    cngt_2   trf_18a         dr_6  blck_8d   que_1a  que_7
--- ---- ------- -------- --------- --- ------- ------- ------- -------
tue 1121    64.67      0.00      1062 ==>     0.00     0.00     0.00  100.00
mon 1120    63.76      0.23      1187 ==>     0.00     0.00     0.00  100.00
sun 1119    62.24      0.00        28 ==>     0.00     0.00     0.00  100.00
```

Figure 64. Area level data on TCH congestion as shown in report 200, Performance statistics (benchmark).

8.4.2 TCH congestion and blocking on BTS hit list

For peak TCH congestion values per cell, run the report **Cells having TCH congestion** (135).

```
================================================================================
=
=                   CELLS HAVING TCH CONGESTION
=
=                   Network:     PLMN
=                   Area:        BSC - BSC1KUTOJA
=                   Period:      from 20010417 to 20010417
=                   Threshold:   0   sec
=
================================================================================

This report shows each measurement period having TCH congestion over the given
threshold.

TSL avail CS          /ava_21   Average nbr of timeslots for CS traffic.
TCH cong (sec)      /cngt_1   Time congestion on TCH
TCH raw blck (%)      /blck_1   Raw blocking on TCH. This may not be real
.                               blocking because DR can take the call to
.                               another cell.

Measurement used: p_nbsc_res_avail, p_nbsc_traffic

Running this report takes a few minutes. Patience please.

================================================================================

                          Cells having TCH congestion
                         between 20010417 and 20010417

                                                                          TCH
                                             Period     Period   TSL         raw
BSC             BCF name                     start      start  avail  Cong   blck
(BTS id)        BTS name                     day        hour      CS (sec)    (%)
--------------- --------------------- ---------- ------ ----- ----- -------

BSC1KUTOJA      BSC1KUTOJA                   2001-04-17 00:00    6.0     0    0.00
(18)            KUTOJAULTRA1

                                                        01:00    6.0     0    0.00
                                                        02:00    6.0     0    0.00
                                                        04:00    6.0     0    0.00
                                                        05:00    6.0     0    0.00
                                                        06:00    6.0     0    0.00
                                                        07:00    6.0     0    0.00
                                                        08:00    6.0     0    0.00
                                                        09:00    6.0     0    0.00

BSC1KUTOJA      BSC1KUTOJA                   2001-04-17 00:00    6.0     0    0.00
(19)            KUTOJAULTRA2

                                                        01:00    6.0     0    0.00
                                                        02:00    6.0     0    0.00
                                                        04:00    6.0     0    0.00
                                                        05:00    6.0     0    0.00
                                                        06:00    6.0     0    0.00
                                                        07:00    6.0     0    0.00
```

```
08:00    6.0    0    0.00
09:00    6.0    0    0.00
```

Figure 65. Report 135: Cells having TCH congestion

For TCH blocking, raw and call blocking, run the report **Cells having high TCH raw blocking** (138).

```
===============================================================================
=
=                  CELLS HAVING HIGH TCH RAW BLOCKING
=
=                  Network:            PLMN
=                  Area:               BSC - BSC1KUTOJA
=                  Period:             from 19991116 to 19991116
=                  Threshold:          blck_1 >= 0
=                  Sorted by:          blck_1
=
===============================================================================

This reports lists all cell having 0   % or more TCH assigns
rejected because of lacking resources.

For each cell:
TCH Call Req        /c1026   TCH call request
New Call            /c1009   TCH call seizures for normal call
DR Out              /dr_3    Successful Directed Retry to another cell
TCH Call Block      /blck_8d TCH Call Block
TCH Raw Block       /blck_1  TCH Raw Block
Ave Avail TCH       /ava_15  Average available TCH

Note: Check the number of available TCHs. If it differs from the normal value,
most probably there is a fault in question, and it should be solved first.

Measurement used: p_nbsc_traffic, p_nbsc_res_avail, p_nbsc_ho

Instructions: The reported cells may need extension or troubleshooting.
Use Cell Analyser or Cell Doctor reports to check the pattern.

Note: Running this report can take a long time if the selected area is large.
Patience please.

===============================================================================

                         Cells Having High TCH Blocking
                          between 19991116 and 19991116

                                                           TCH      TCH
                                       TCH                 Call     Raw      Ave
BSC           BCF Name                 Call    New Call    Block    Block    Avail
(BTS id)      BTS Name                 req     DR Out         %        %       TCH
------------- ----------------- ------- -------- -------- -------- --------
BSC1KUTOJA    KUTOJA1002                   50       49    2.000   21.989   13.953
(2)           KUTOJA001                              0

BSC1KUTOJA    KUTOJA1001                    0        0    0.000    0.000    3.214
(1)           KUTOJA001                              0
```

Figure 66. Report 138: Cells having high TCH raw blocking

For the call blocking (`blck_8a`) peak hour value and average, run the report **Busy hour traffic for all BTSs** (182).

```
===============================================================================

                                                         TCH CS
                                    PEAK      TCH CS   call      SDCCH     SDCCH
                                    HOUR      traff    block     traff     block
                                    (mmddhh)  (Erl)    (%)       (mErl)    (%)
                                    *****     *****    *****     *****     *****
BSC name      BCF name              TCH CS    BH       BH        BH        BH
(BTS id)      BTS name              SDCCH     AVE      AVE       AVE       AVE
------------- -------------------- -------- ------- -------- --------- --------
BSC1KUTOJA    KILO007               011512     0.41     0.0       11.1     0.0
(13)          TKARA13               011515     0.05     0.0        3.1     0.0

BSC1KUTOJA    KUTOJA001             011500     0.00     0.0       56.8     0.0
(1)           KUTOJATALKFAM1        011508     0.00     0.0        9.7     0.0

BSC1KUTOJA    KUTOJA001             011500     0.00     0.0       11.4     0.0
(2)           KUTOJATALKFAM2        011508     0.00     0.0        2.2     0.0
```

Figure 67. Report 182: Busy hour traffic for all BTSs

8.4.3 TCH congestion and blocking on BTS level

For TCH congestion and blocking on the BTS level, run the report **Cell analyser** (216).

```
TCH requests for FACCH call
setup ........../c1043      0.0          0.0
. BLOCKED ................................/blck_14        na %          na %
. TCH seizures......................./100-blck_14        na %          na %

TCH requests for new call ................/trf_18a      0.7           6.0
. Succ. DR HO out to other cell ............./dr_6      0.00 %        0.00 %
. Succ. DR HO intracell ..................../c4074      0.00 %        0.00 %
. To queue ................................/c1016      0.00 %        0.00 %
.    From queue to DR (S8)................../c1178      0.00 %        0.00 %
.    Unserved queued ......................./c1024        na %          na %
. TCH normal seizures (queued or not) ...../trf_55    100.00 %      100.00 %
. Blocked calls ........................./blck_8d      0.00 %        0.00 %

TCH requests for handovers ................/ho_14b      0.8           8.0
. Succ. TCH seizures for HO, queued ......./que_2a      0.00 %        0.00 %
. Succ. TCH seizures for HO, nonqueued ..../que_8a    100.00 %      100.00 %
. Blocked handovers ...................../blck_11c      0.00 %        0.00 %

TCH requests due to Aif pool mismatch ....../c1122      0.0           0.0
. Call retries due to Aif pool mismatch .../trf_49        na %          na %
. HO retries due to Aif pool mismatch ...../trf_50        na %          na %

SMS establishments.............................         0.0           0.0
. Succesfull SMS establishments ............/c3026    100.00 %          na %
. Unsuccesfull SMS establishments ........../c3027      0.00 %          na %

TCH usage ................................./trf_3     0.05 %        1.11 %
HO / Calls ratio ......................../trf_13e   128.57 %      133.33 %

TCH congestion time ....................../cngt_1      0.0 s         0.0 s
Peak busy TCH (max)......................./trf_19      3.0           3.0
TCH traffic ......................(Erl)../trf_12a      0.0           0.2
```

```
************************************************************************
TCH call blocking percentage (blck_8d)
BSC1KUTOJA      BTS:20 SANDPD1020      BCF:SANDPD010
************************************************************************

Blank hours are either missing data or no TCH call requests.

Hints: For BTS level hit list run the report 250.

     fri   sat   sun   mon   tue   wed   thu   fri   sat   sun   mon
      10    11    12    13    14    15    16    17    18    19    20
Hr   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP
-- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
00
01
02
03
04
05
06
07                                     0.0   0.0
08   0.0                   0.0              -1.0
09   0.0                  -1.0   0.0   0.0   0.0               0.0
10   0.0             0.0   0.0   0.0  -1.0   0.0               0.0
11   0.0                   0.0         0.0   0.0
12   0.0                   0.0   0.0   0.0   0.0   0.0
13   0.0             0.0   0.0   0.0   0.0  -1.0
14   0.0             0.0         0.0   0.0        -1.0   0.0   0.0
15  -1.0             0.0   0.0         0.0               0.0
16   0.0            -1.0              -1.0                    -1.0
17                                                 0.0
18
19
20
21
22
23
```

Figure 68. BTS level data on TCH congestion and blocking as shown in report 216, Cell analyser.

For the hourly congestion values, see the report **Cell doctor** (213).

8.5 Traffic

BSS Network Doctor provides a variety of reports to monitor traffic in the network on various levels.

8.5.1 Hourly traffic on BSC level

To see the traffic on the BSC level per hour, run the report **TCH traffic (Erlang) per hour for each BSC** (180).

```
===============================================================================
=
```

```
=                    TCH TRAFFIC (ERLANG) PER HOUR FOR EACH BSC
=
=                    Network:            PLMN
=                    Period:             from 19991116 to 19991116
=
===============================================================================

For each BSC report:
Traffic          /trf_1a  BSC traffic in Erlang
Congesction      /cngt_1  Congestion time in seconds
Avail TCHs       /ava_5   Number of available TCHs

Measurement used: p_nbsc_res_avail


===============================================================================


                            Erlangs per hour for BSCs

Object:      BSC1KUTOJA-50264

                       Traffic                                        Number of
Start hour             (Erlang)   Congestion (sec)  Avail TCHs       BTSs
---------------------- ---------- ----------------- ---------- ---------
06:00 -                      0.00              0.00     167.00        16
07:00 -                      0.00              0.00     167.00        16
08:00 -                      7.67              0.00     157.12        16
09:00 -                      8.43              0.00     153.00        16
10:00 -                      8.39              0.00     152.53        16
```

Figure 69. Report 180: TCH traffic (Erlang) per hour for each BSC

8.5.2 Traffic on area level

For daily sums of traffic, use the report **Performance statistics (benchmark)** (200).

```
                                                 Avg
                              TCH      HO/      TCH   call       AG
              Call     time    Calls    Usage   lgth     block
              bids     (hr)      (%)      (%)  (sec)       (%)
Day MMDD   trf_39a trf_24c trf_13e   trf_3 trf_2d  blck_13
--- ---- --------- ------- ------- ------- ------ -------
tue 1121      1062      44   53.30    0.15    137   0.000
mon 1120      1187      53   43.05    0.19    148   0.000
sun 1119        28       6   78.57    0.02    711   0.000

              HO       HO TCH      TCH
            fail     blck drop     drop
             (%)      (%) (%)      (%)
Day MMDD   hfr_2   hfr_55 dcr_3i   dcr_3j
--- ---- ------- ------- ------- -------
tue 1121    4.75    0.00    5.65    5.65
mon 1120    8.74    0.00    5.14    5.14
sun 1119    0.00    0.00    7.14    7.14
```

Figure 70. Report 200: Daily sums of traffic in report 200, Performance statistics (benchmark).

The **Call distribution per LA** (222) report shows for each location area:

- The count of TCH and SDCCH seizures for terminating and originating normal call setup
- The share (%) of calls
- The count of sent pagings

```
================================================================================

        Nbr Calls                                     Paging    Pgn
         of in LA    MTC   MOC  FMOC  FMTC    Sent   succ
   LAC  BTS   %    *1000 *1000 *1000 *1000   *1000    (%)
------ ----- ------ ----- ----- ----- ----- ------- ------
 89064    64    6.5   477   714     0     0     654   73.0
 89065    45    3.2   238   360     0     0     487   48.8
 89066    60    9.0   632  1029     0     0     753   84.0
 89067    71    8.6   569  1018     0     0    1168   48.7
 89068    59    5.1   358   581     0     0     851   42.1
 89069    29    6.6   454   770     0     0     963   47.2
 89070    53    6.6   359   856     0     0     940   38.2
 89071    42    3.9   284   428     0     0     643   44.2
 89072    54    6.5   450   758     0     0    1068   42.1
 89073    36    5.5   404   618     0     0     912   44.3
 89074   150    9.7   673  1120     0     0     745   90.4
 89075    75    4.0   209   528     0     0     500   41.8
 89076    39    3.0   890   333     0     0     563   40.4
 89077   111    9.8   688  1127     0     0     758   90.8
 89078    55    5.3   374   608     0     0     726   51.6
 89079    36    6.6   422   799     0     0     852   49.5

Total number of calls in the whole PLMN during given period =  18463286
```

Figure 71. Report 222: Call distribution per LA

You can select to run the report over the whole given period or over the traffic busy period of each location area.

For traffic on hourly level, run the report **Performance profiles for area, 24-hour/10-day breakdowns** (207).

```
                  TCH traffic until 19991110
                  formula:trf_1 , unit: Erl

     sun   mon   tue   wed   thu   fri   sat   sun   mon   tue   wed
      31    01    02    03    04    05    06    07    08    09    10
Hr   OCT   NOV   NOV   NOV   NOV   NOV   NOV   NOV   NOV   NOV   NOV
-- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
06     0     0     0     0     0     8     0     0     0     8     0
07     0     0     0     0     0     7     0     0     0     8     0
08     0     1     0     0     0     7     0     0     0     8     0
09     0     0     0     0     0     9     0     0     1     8     0
10     0     1     0     0     0     9     0     0     9     8     1
11     0     1     0     0     0     9     0     0     9     9     0
12     0     1     0     0     0     8     0     0     9     8     0
13     0     1     0     0     1     8     0     0     8     8     0
14     0     0     0     0     3     8     0     0     9     8     1
```

```
15      0      1      1      0      8      8      0      0      9      9      1
16      0      0      0      0      8      1      0      0      8      1      0
17      0      0      0      0      8      0      0      0      8      0      0
18      0      0      0      0      8      0      0      0      8      0      0
19      0      0      0      0      8      0      0      0      8      0      0
20      0      0      0      0      8      0      0      0      8      0      0
21      0      0      0      0      8      0      0      0      8      0      0
```

Figure 72. Hourly area-level traffic in report 207, Performance profiles for area, 24-hour/10-day breakdowns.

8.5.3 Traffic on BTS hit list level

The data on busy hours by BTS for SDCCH and TCH traffic is provided by the report **Busy hour traffic for all BTSs** (182). By following the busy hour traffic trend you can estimate possible future congestion.

```
===============================================================================

                                                 TCH
                                   PEAK     TCH     call     SDCCH     SDCCH
                                   HOUR     TRAFF   block    TRAFF     block
                                   (mmddhh) (Erl)   (%)      (mErl)    (%)
                                   *****    *****   *****    *****     *****
BSC name      BCF name             TCH      BH      BH       BH        BH
(BTS id)      BTS name             SDCCH    AVE     AVE      AVE       AVE
------------- -------------------- -------- ------- -------- --------- --------
BSC4TRE       HERMIA002             090714     6.00               50.3     0.0
(4)           4HERMIA3C             090715     0.24     7.9        6.0     0.0

BSC4TRE       HERMIA001             090619     4.15     0.0       33.3     0.0
(3)           3HERMIA3C             090615     0.68     0.0        7.1     0.0

BSC4TRE       HERMIA001             090618     3.00              472.2     0.0
(2)           2HERMIA3C             090710     0.16     0.0       18.1     0.0
```

Figure 73. Report 182: Busy hour traffic for all BTSs

For summarised and average traffic, see the report **Cells having maximum TCH traffic** (185). This report also shows the values for call blocking and TCH HO blocking.

```
===============================================================================
=
=                  CELLS HAVING MAXIMUM TCH TRAFFIC
=
=                  Network:      PLMN
=                  Area:         All BTSs selected
=                  Period:       from 20010115 to 20010115
=                  Threshold:    dual band traffic share >=    0.0 %
=                  Threshold:    TCH usage >=    0.0 %
=                  Sorting:      by usage %
=
===============================================================================

The following data is shown per cell sorted out by traffic:
```

```
Traffic sum       /trf_1           Sum of average busy TCH for CS traffic
.                                  (Erlang hours if 60 min meas. period used)
Traffic ave       /trf_12b         Average CS traffic (erlang).
Congestion        /cngt_1          TCH congestion.
Avl TCH           /ava_15+ava_16   Average available TCH (total CS+PS capacity).
CS usg (%)        /trf_83          Average usage of TCH by CS traffic.
Call blck         /blck_8d         Average TCH call blocking.
HO blck           /blck_11c        Average TCH handover blocking.
Dual band         /trf_48          Traffic share of dual band MS.

Measurement used: p_nbsc_traffic, p_nbsc_res_avail, p_nbsc_ho, p_nbsc_dual_band

Note: For full CS+PS view on the traffic use report 229.
Note: Running this report takes a few minutes. Patience please.

===============================================================================

                                Cell TCH Traffic
                          between 20010115 and 20010115
```

BSC (BTS id)	BCF Name BTS Name	Traffic ******* Sum Ave	Cong (sec)	Avl TCH CS usg (%)	Call blck (%)	HO blck (%)	Dual band (%)
BSC4TRE		3.1	61.5	0.8	0.0	0.0	100
(43)		0.1		17.5			
BSC4TRE	1800_3Cil	16.7	0.0	12.9	0.0	0.0	100
(2)	2HERMIA3C	0.7		5.7			
BSC4TRE	1800_3Ail	15.9	0.0	14.0	0.0	0.0	100
(7)	7HERMIA3A	0.7		5.0			

Figure 74. Report 185: Cells having maximum TCH traffic

8.5.4 Traffic on BTS level

For averages over the whole period, the busy hour and hourly breakdown, run the report **Cell analyser** (216).

```
************************************************************************
Peak busy TCH (trf_19)
BSC1KUTOJA      BTS:20 SANDPD1020      BCF:SANDPD010
************************************************************************

Blank hours are missing data.
```

Hr	fri 10 SEP	sat 11 SEP	sun 12 SEP	mon 13 SEP	tue 14 SEP	wed 15 SEP	thu 16 SEP	fri 17 SEP	sat 18 SEP	sun 19 SEP	mon 20 SEP
00	0			0	0						
01	0			0	0						
02	0			0	0						
03	0			0	0						
04	0			0	0						
05	0			0	0						
06	0			0	0	0	0	1	0	0	0
07	0			0	0	0	1	1	0	0	0
08	3			0	2	0	0	1	0	0	0
09	2			0	1	2	1	2	0	0	1
10	3			1	1	2	1	1	0	0	1

11	4			0	4	0	1	3	0	0	1
12	2			1	4	2	2	1	1	0	0
13	2			1	1	1	1	1	0	0	0
14	3			2	0	2	2	1	1	2	1
15	2			1	1	0	2	1	0	2	0
16	1			1	0	0	1	0	0	0	1
17	0			0	0	0	0	0	1	0	0
18	0			0	0	0	0	0	0	0	0
19	0			0	0	0	0	0	0	0	0
20	0			0	0	0	0	0	0	0	0
21	0			0	0	0	0	0	0	0	0
22	0			0							
23	0			0							

```
************************************************************************
TCH traffic (Erlang)      (trf_12a)
BSC1KUTOJA      BTS:20 SANDPD1020      BCF:SANDPD010
************************************************************************
```

Blank hours are missing data.

Hints: For BTS level hit list run the report 185.

Hr	fri 10 SEP	sat 11 SEP	sun 12 SEP	mon 13 SEP	tue 14 SEP	wed 15 SEP	thu 16 SEP	fri 17 SEP	sat 18 SEP	sun 19 SEP	mon 20 SEP
00	0.0			0.0	0.0						
01	0.0			0.0	0.0						
02	0.0			0.0	0.0						
03	0.0			0.0	0.0						
04	0.0			0.0	0.0						
05	0.0			0.0	0.0						
06	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
07	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08	0.3			0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
09	0.1			0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
10	0.0			0.0	0.4	0.3	0.0	0.0	0.0	0.0	0.0
11	0.7			0.0	0.8	0.0	0.0	0.2	0.0	0.0	0.0
12	0.0			0.0	0.5	0.0	0.1	0.1	0.0	0.0	0.0
13	0.2			0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
14	0.1			0.2	0.0	0.0	0.4	0.0	0.0	0.0	0.0
15	0.0			0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0
16	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0			0.0							
23	0.0			0.0							

Figure 75. BTS level data on traffic averages over the whole period in report 216, Cell analyser.

The **Daily TCH traffic profile for a BTS** (181) report shows for each hour of the given time period:

- Average and peak number of busy TCH
- Congestion time of SDCCH and TCH

- TCH seizures for a normal call and handovers
- TCH seizure attempts for calls and handovers failing due to congestion
- Number of attempted and successfully directed new calls from the SDCCH of the selected cell to the TCH of another cell

```
===============================================================================
=
=                   DAILY TCH TRAFFIC PROFILE FOR A BTS
=
=                   Network:            PLMN
=                   BSC:                BSC MERKURIUS
=                   BCF:                (7)   MetroSite
=                   BTS:                (9)   KPNMETRO
=                   Period:             from 20010516 to 20010516
=
===============================================================================

Measurement used: p_nbsc_traffic, p_nbsc_res_avail, p_nbsc_res_access

Note: The results are shown only for those hours when there are results from
Traffic and Resource Availability measurements.


The report shows for each hour of the given time period:

CS traff ave         /trf_12b   Average CS traffic in Erlang.
CS traff peak        /c2029     Peak CS traffic in Erlang.
SDCCH avail          /ava_3     Average nbr of SDCCH .
SDCCH cong time      /cngt_1    Congestion time of SDCCH in (sec).
SDCCH dyn reconf att /c1154     Congestion time of SDCCH in (sec).
TCH CS avail         /ava_21    Average nbr of TCH available for CS traffic.
TCH cong time        /cngt_2    Congestion time of TCH in (sec).
Calls norm           /c1009     TCH seizures for normal call.
Calls DR in          /dr_4      TCH seizures for calls started as incoming DR.
Blckd Calls          /blck_9c   TCH seizure att. failing due to congestion.
HOs                  /c1008     TCH seizures for HO.
Blocked HOs          /blck_10b  TCH seizure att. for HO failing due to congestion.
DR out att           /dr_1      Number of new calls attempted to direct from
.                               SDCCH of this cell to TCH of another cell.
DR out succ          /dr_3      Number of new calls successfully directed
.                               from SDCCH of this cell to TCH of another cell.

Note: to see the PS traffic use report 229

===============================================================================

                                             Daily traffic profile
                                 for BTS- 9 KPNMETRO        of BSC MERKURIUS
                                           from 20010516 to 20010516
```

DD	HH	SDCCH avail	SDCCH cong time (sec)	SDCCH dyn reconf att	CS TCH avail	CS traff ave (erl)	CS traff peak (erl)	TCH cong time (sec)	Calls norm	Calls DR in	Blckd Calls
16	00	8.0	0.0	0.0	14.0	2.00	2	0.0	0	0	0
	01	8.0	0.0	0.0	14.0	0.78	2	0.0	0	0	0
	02	8.0	0.0	0.0	14.0	0.00	0	0.0	0	0	0
	03	8.0	0.0	0.0	14.0	0.00	0	0.0	0	0	0
	04	8.0	0.0	0.0	14.0	0.00	0	0.0	0	0	0
	05	8.0	0.0	0.0	14.0	0.00	0	0.0	0	0	0
	06	8.0	0.0	0.0	14.0	0.00	0	0.0	0	0	0
	07	8.0	0.0	0.0	14.0	0.00	0	0.0	0	0	0
	08	8.0	0.0	0.0	14.0	0.00	0	0.0	0	0	0
	09	8.0	0.0	0.0	14.0	1.46	2	0.0	2	0	0

```
   10     8.0     0.0     0.0    14.0   2.00      2     0.0        0        0      0
   11     8.0     0.0     0.0    14.0   1.91      2     0.0        0        0      0
   12     1.7     0.0     0.0     2.9   0.00      0     0.0        0        0      0


                      DR     DR
         Blocked     out    out
     HOs     HOs     att   succ
 ------- ------- ----- -----
       0       0     0      0
       0       0     0      0
       0       0     0      0
       0       0     0      0
       0       0     0      0
       0       0     0      0
       0       0     0      0
       0       0     0      0
       0       0     0      0
       0       0     0      0
       0       0     0      0
       0       0     0      0
       0       0     0      0
```

Figure 76. Report 181: Daily TCH traffic profile for a BTS

8.6 Miscellaneous

The **BSC unit load per hour for each BSC** (184) report shows for every processor unit of all BSCs:

- Average load
- Minimum and maximum peak load
- Time when the maximum peak load of a unit occurs

```
===============================================================================


             Unit load % per day for BSCs from 19991116 to 19991116

Object:      BSC3TRE-50266

                          Avg load  Min peak  Max peak  Peak hour
Unit name and index          (%)    load (%)  load (%)  (yyyymmddhh)
------------------------- --------- --------- --------- ------------
BCSU-0                        0.00      3.00      3.00  1999111600
BCSU-1                        0.00      2.00      3.00  1999111600
BCSU-2                        0.00      2.00      3.00  1999111603
BCSU-3                        0.00      2.00      4.00  1999111604
MB-0                          1.10     10.00     10.00  1999111600
MCMU-0                        1.00      9.00     11.00  1999111601
```

```
MCMU-1                        0.73      7.00      9.00  1999111614
OMU-0                         2.16     23.00     41.00  1999111603
```

Figure 77.   Report 184: BSC unit load for each BSC

In the **Cells having maximum paging traffic** (186) report the cells are reported in the order of the number of paging messages sent. For each cell the following values are counted:

- Number of paging messages sent
- Average PCH load
- Number of terminated calls
- Minimum paging buffer space on PCH
- Average of the minimums of paging buffers.

```
===============================================================================


                               BTS paging traffic
                          between 20011121 and 20011121

                                                 GSM         GSM   GPRS  Air-if
                                                 buf   GPRS  buff  buff  occup
                                   CS pgn (Aif)  free  buf   occup occup (%)
                                   PS pgn (Gb)   space free  (%)   (%)   ****
                                   CS pgn (Gb)   ***** space ****  ****  DRX pg
BSC             BCF name           Pgn delet     ave   ***** ave   ave   DRX AG
(BTS id)        BTS name           MTC           min   ave   max   max   nDRX AG
--------------- ------------------ ------------  ----- ----- ----- ----- -------
BSC7SALO                                    760     96     0     0     0       0
(30)            SIILO30                       0     95           0     0       0
                                              0                                0
                                              0
                                              0

BSC7SALO                                    760     96     0     0     0       0
(31)            SIILO31                       0     95           0     0       0
                                              0                                0
                                              0
                                              0

BSC7SALO                                    760     96     0     0     0       0
(32)            SIILO32                       0     95           0     0       0
                                              0                                0
                                              0
                                              0
```

Figure 78.   Report 186: Cells having maximum paging traffic

In the **Cell location updates** (187) report the BTSs are reported in the order of average LU counts (Avg LU). A high LU amount can cause SDCCH blocking. One possible reason is an MS moving across the LA border in idle mode. A high number of handovers from other location areas may also mean that there is a high number of idle MSs moving from those areas.

```
===============================================================================

                         Location updates per cell
                       between 19991116 and 19991116

                               SDCCH bl % Avg LU
BSC Name    BCF Name           SDCCH us % Avg MTC  LUP (h)  Adj across
(BTS id)    BTS Name           SDCCH av % Avg MOC  HYS (dB) HOs across
----------- --------------- ---------- -------- -------- ----------
BSC1KUTOJA  SANDPG009             0.00        9    3.0            3
(18)        SANDPG1018            0.16      0.1    4.0            0
                                100.00      3.3

BSC1KUTOJA  KUTOJA001             0.00        8    0.5            1
(2)         KUTOJA1002            0.10      0.1    4.0            0
                                 99.67      3.1
```

Figure 79. Report 187: Cell location updates

In the **Cells having highest RACH load** (188) report the BTSs are reported in the order of peak RACH load counts. An extremely high RACH load can indicate a cell with fatal problems. In that case use the **Cell analyser** (216) report to check the cell.

```
===============================================================================

                               Rach load (%)
                       between 19991116 and 19991116

BSC           BCF Name                        RACH load
(BTS id)      BTS Name                              (%)
------------- ------------------------------ ---------
BSC1KUTOJA    KUTOJA001                              1
(1)           KUTOJA1001

BSC1KUTOJA    SANDPG009                              0
(18)          SANDPG1018

BSC1KUTOJA    KUTOJA001                              0
(2)           KUTOJA1002

BSC1KUTOJA    SANDPG009                              0
(17)          SANDPG1017
```

Figure 80. Report 188: Cells having peak RACH load

The **Cells sorted out by SDCCH or TCH holding time** (189) report shows for each cell the average SDCCH and FTCH holding time.

```
===============================================================================

                         Cells by holding time
                     between 19991116 and 19991116

                                           Average SDCCH Average FTCH
BSC Name        BCF Name                    holding time holding time
(BTS id)        BTS Name                           (sec)        (sec)
--------------- ------------------ ------------- ------------
BSC1KUTOJA      SUOSAA004                            0.0          0.0
(7)

BSC1KUTOJA      SANDPD010                            0.0          0.0
(20)            SANDPD1020

BSC1KUTOJA      LAAJAL010                            0.0          0.0
(10)            LAAJAL1010

BSC1KUTOJA      KILONKALLIO008                       0.6          0.0
(14)            KKALLI1014

BSC1KUTOJA      SANDPG009                            0.9          0.0
(17)            SANDPG1017

BSC1KUTOJA      KUTOJA001                            1.1          0.0
(1)             KUTOJA1001

BSC1KUTOJA      KILONKALLIO008                       1.5          0.0
(16)            KKALLI1016

BSC1KUTOJA      KILO007                              1.8          0.0
(13)            KILO1013
```

Figure 81. Report 189: Cells sorted out by SDCCH or TCH holding time

The **Cells having most delete indications and P-Imm.Ass.NACK** (202) report shows the BTSs with reference to the greatest number of delete indication messages and P-Immediate Assignment NACK in descending order. A BTS sends a delete indication message to BSC when AG buffer overflow occurs in the BTS. This message means that either the Immediate Assignment message or the Immediate Rejected message sent by BSC to BTS has been lost. A BTS sends a P-Imm.Ass NACK message to BSC when AG buffer overflow occurs in the BTS, maximum lead time expires or starting time expires. This message means that either the P-Immediate Assignment message or the P-Immediate Rejected message sent by BSC to BTS has been lost.

```
===============================================================================
            Cells having most Delete Indications and P-Imm.Ass. NACK
                     between 20000829 and 20001217

                                                        Nbr of
                                             Nbr of P-Imm.Ass.
BSC Name        BCF Name                    Del Ind       NACK
(BTS id)        BTS Name                   received   received
--------------- -------------------- -------- ----------
```

```
BSC3TRE          HATANP001                   1002          0
(3)              HATANP3003
```

Figure 82. Report 202: Cells having most delete indications and P-Imm.Ass.NACK

9 Call success

In this chapter call success is handled under the following headings:

- Traffic channel access and success
- SMS establishment failures
- RACH rejections
- High HO attempts/call ratio
- Transcoder failures
- High drop call count in handovers

9.1 Traffic channel access and success

The overall call success is the product of the following factors:

- SDCCH access
- SDCCH success
- TCH access
- TCH success

This is an alternative way to analyse the network instead of focusing the contributors separately (SDCCH blocking, SDCCH drops, TCH blocking, TCH drop calls).

BSS Network Doctor provides reports for analysing the call success on all levels from BTS area to a single BTS.

The **Network benchmark statistics** (204) report shows the area level values for the call success factors as an average.

```
CALL SUCCESS FACTORS
====================
SDCCH access probability
.     (before FCS) ............................./csf_1      100.00 %
```

```
.     (after FCS) .........................../csf_1a      100.00 %

SDCCH success ratio
.     (SDCCH fail based, incl.LU) ............/csf_2e       97.92 %
.     (SDCCH to TCH based) .................../csf_2m       96.91 %

TCH access probability
.     (before DR and queuing) ................/csf_3m       99.91 %
.     (before DR) ............................/csf_3i       99.91 %
.     (real) ................................./csf_3l       99.91 %

TCH success ratio
.     (before re-est.) ......................./csf_4u       96.50 %
.     (after re-est) ........................./csf_4v       96.50 %

Note: See the formula descriptions for the accuracy limitations.
Note: For a cell level list, run report 250.
```

Figure 83. Call success factors in report 204, Network benchmark statistics

The **Performance statistics (benchmark)** (200) report shows the area level values for the call success factors as daily values.

Day	MMDD	SDCCH access probab (%) csf_1	SDCCH access probab (%) csf_1a	SDCCH success ratio (%) csf_2e	SDCCH success ratio (%) csf_2m	TCH access probab (%) csf_3m	TCH access probab (%) csf_3i	TCH access probab (%) csf_3l	TCH success ratio (%) csf_4u	TCH success ratio (%) csf_4v
tue	1121	99.98	99.98	98.34	76.73	100.00	100.00	100.00	94.35	94.35
mon	1120	99.95	99.95	98.31	88.32	100.00	100.00	100.00	94.86	94.86
sun	1119	100.00	100.00	98.56	100.00	100.00	100.00	100.00	92.86	92.86

Figure 84. Call success factors as daily values in report 200, Performance statistics (benchmark)

The **Performance profiles for area, 24-hour/10-day breakdowns** (207) report shows the area level values on hourly level.

SDCCH Success Ratio (%) until 19991110
formula: csf_2a, unit: %

Hr	sun 31 OCT	mon 01 NOV	tue 02 NOV	wed 03 NOV	thu 04 NOV	fri 05 NOV	sat 06 NOV	sun 07 NOV	mon 08 NOV	tue 09 NOV	wed 10 NOV
06	88.9	100.0	100.0	100.0							100.0
07	100.0	100.0	100.0	100.0							91.3
08	100.0	90.0	100.0	86.8							97.4
09	100.0	100.0	97.4	96.8							95.7
10	100.0	98.4	98.4	97.9						96.6	97.3
11	100.0	96.8	100.0	100.0						94.6	97.7
12	100.0	97.1	100.0	96.3						100.0	95.5
13	100.0	94.3	96.9	85.7						96.4	100.0
14	92.9	93.8	98.3	98.7						98.1	100.0
15	100.0	98.8	98.6							93.4	98.5
16	95.2	95.3	100.0	100.0						100.0	98.0
17	86.7	100.0	100.0	87.0						97.4	100.0

```
18  100.0  100.0  100.0   90.0                                          100.0  100.0
19   96.4  100.0  100.0   88.9                                          100.0   97.1
20   92.9   95.5  100.0  100.0                                          100.0  100.0
21   95.2  100.0  100.0  100.0                                          100.0  100.0
22                       100.0

                    TCH Success ratio until 19991110
           formula: csf_4v (after re-establishment), unit: %

      sun    mon    tue    wed    thu    fri    sat    sun    mon    tue    wed
       31     01     02     03     04     05     06     07     08     09     10
Hr    OCT    NOV    NOV    NOV    NOV    NOV    NOV    NOV    NOV    NOV    NOV
-- ------ ------ ------ ------ ------ ------ ------ ------ ------ ------ ------
06
07
08                100.0  100.0                                                 100.0
09                 80.0                                                        100.0
10         100.0  100.0   90.0                                          94.4   83.3
11          95.0  100.0                                                 83.3  100.0
12                       100.0                                         100.0  100.0
13         100.0   96.0   -1.0                                         100.0
14                100.0  100.0                                          95.5   71.4
15         100.0  100.0                                                100.0   90.0
16         100.0  100.0                                                100.0  100.0
17         100.0
18                100.0                                                        100.0
19
20
21
22
```

Figure 85. Area-level success ratios on hourly level in report 207, Performance profiles for area, 24-hour/10-day breakdowns

The **Cells by call success ratio** (250) report shows the BTS level values for the call success factors as an average.

```
==============================================================================
                          Call Success Ratio per Cell
                         between 20010926 and 20010926

                  Ave
                  avail             SDCCH   SDCCH     TCH     TCH
BSC (BTS id)      ******           access success  access success          Call
BCF NAME          SDCCH     SDCCH  probab   ratio  probab   ratio       success
BTS NAME          TCH        seiz  csf_1a  csf_2a  csf_3l  csf_4y         ratio
----------------- ------- ------- ------- ------- ------- ------- --- -------
BSC4TRE (45)         0.39       4  100.00  100.00    0.00    0.00 ==>     0.00
900 H6 -1 KRS        0.07
45HERMIA61KRS

BSC4TRE (7)         11.00      42  100.00  100.00    0.00  100.00 ==>     0.00
1800_3Ail            7.00
7HERMIA3A
```

Figure 86. Report 250: Cells by call success ratio

The **Call success profiles of a cell** (251) report shows the overall call success ratio as a result of access probability and success ratio of the SDCCH and TCH channels for a single cell.

```
===============================================================================
                       Call Success Ratio of SANDPG1018
                          between 19990912 and 19990913

                  Ave
                  avail              SDCCH   SDCCH      TCH     TCH
                  ******            access success   access success        Call
                  SDCCH       SDCCH probab   ratio   probab   ratio     success
Day Date      HH  TCH          seiz /csf_1a /csf_2e /csf_3l /csf_4x       ratio
--- --------- --- -------- ------- ------- ------- ------- ------- --- -------
Mon 19990913  08     11.00       16  100.00   84.62  100.00  100.00 ==>   84.62
                      6.00

              09     11.00       33  100.00   96.97  100.00  100.00 ==>   96.97
                      6.00
```

Figure 87. Report 251: Call success profiles of a cell

10 Transmission

In this chapter, the BSS Network Doctor reports about transmission are discussed under the following topics:

- Transmission alarms
- Cell outage
- Transmission availability and quality
- Transmission object profiles

10.1 Transmission alarms

The quality of the transmission can be measured as a count of different transmission alarms. Usable alarms in this respect are the TRX alarm 7705, LAPD Link Failure and BTS alarm 2567, BCCH Missing.

The former describes the situation when the signalling link between a BSC and BTS has been disturbed. The latter, again, describes the situation when the cell has been down, although it is not known whether it results from transmission or something else.

To see the occurrences of TRX alarm 7705 per day and per BTS, run the report **BSC alarm breakdown** (030).

```
===============================================================================

=
=                    BSC ALARM BREAKDOWN
=
=                    Network:            PLMN
=                    Maintenance Region: all MRs
=                    Alarm object:       MSC
=                    Alarm id:           1072
=                    Alarm txt:          SIGNALLING LINK OUT OF SERVICE

=                    Period:             10 days ending on 19991012
=
===============================================================================

Alarms (ID given by user) received from the network are presented for
all MSCs over 10 days.
```

```
- alarm ID
- last day of 10 days period

Note that only alarms related to objects that are assigned to a Maintenance
Region are displayed.

===============================================================================

                       Breakdown for MSC alarm       1072

                 sat   sun   mon   tue   wed   thu   fri   sat   sun   mon   tue
                  02    03    04    05    06    07    08    09    10    11    12
MSC              OCT   OCT   OCT   OCT   OCT   OCT   OCT   OCT   OCT   OCT   OCT
------------ ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
MSC1KUTOJA        58    56    60    58    68    66    82    85    90    94    68
             ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
sum               58    56    60    58    68    66    82    85    90    94    68
```

Figure 88. Report 030: BSC alarm breakdown

10.2 Cell outage

If the LAPD link is down long enough, the entire BTS may lose service, and the BCCH Missing alarm is generated by the BSC.

To see the BCCH Missing alarm (=cell outage) occurrences per day and per BTS, run the report **Cell outage breakdown over 10 days** (027).

```
===============================================================================
=
=                   CELL OUTAGE BREAKDOWN OVER 10 DAYS
=
=                   Network:        PLMN
=                   Area:           All BTSs selected
=                   Period:         10 days until   19981130
=
===============================================================================

The BCCH missing alarms (2567 until S7, 7767 since S7) received from the area
during the given period are presented for all BTSs over a period of 10 days.

The number in the table means the number of occurrences of 'BCCH missing'
alarms (i.e. the start of cell outage) during the day.
Note that the BCCH missing alarm means that the cell has been down.

===============================================================================

                              Cell Outage Breakdown

BTS name              fri  sat  sun  mon  tue  wed  thu  fri  sat  sun  mon
BCF name               20   21   22   23   24   25   26   27   28   29   30
BSC name (BTS id)     NOV  NOV  NOV  NOV  NOV  NOV  NOV  NOV  NOV  NOV  NOV
-------------------- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ----
3UPS2001                                               3
3UPS001
BSC2UPS1(1)

3UPS2002                                               3
3UPS001
```

```
BSC2UPS1(2)

                          ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ----
sum                                                                6
```

Figure 89. Report 027: Cell outage breakdown over 10 days

10.3 Transmission availability and quality

To see the summary information on transmission availability and quality, run the report **Transmission statistics** (518).

```
===============================================================================
=
=                    TRANSMISSION STATISTICS
=
=                    Network:       PLMN
=                    BSC:           all BSC
=                    Period:        from 20000523 to 20000529
=
===============================================================================


===============================================================================
=
=                                   DMR
=
===============================================================================

Avail (%)          /ava_6  Availability
Err sec            /c62002 The total duration of the errored seconds.
Severe Err sec     /c62003 The total duration of the severely errored seconds.
Degr min           /c62004 The total duration of the degraded minutes.

Measurement used: p_nbsc_dmr

===============================================================================
                                BSC1KUTOJA-  DMR
                            from 20000523 to 20000529

                   Avail         Severe
  DMR DMR            (%)    Err    Err   Degr
index name         ava_6    sec    sec    min
----- ---------- ------- ------ ------ ------
 1001 KUT-SUOS     96.71  65110   4999   2429
 1002 SUOS-KUT     99.39   4139    255    153
 1003 SUOS-LAAJA  100.00     38     26     28
 1004 LAAJAL-SUO  100.00     10      7      6
 1007 LAAJAL        0.00      0      0      0
 1011 BSC1KUTOJA  100.00      0      0      0

                                 BSC2UPS1-  DMR
                            from 20000523 to 20000529

                   Avail         Severe
  DMR DMR            (%)    Err    Err   Degr
index name         ava_6    sec    sec    min
----- ---------- ------- ------ ------ ------
```

```
    1             100.00     42     44      5
-


===============================================================================
=
=                                 DN2
=
===============================================================================

Port                      Port of DN2
Dir                       Direction
Avail (%)          /ava_7  Availability
Err sec            /c63002 The total duration of the errored seconds.
Err sec severe     /c63003 The total duration of the severely errored seconds.
Degr min           /c63004 The total duration of the degraded minutes.

Measurement used: p_nbsc_dn2

===============================================================================

                                BSC1KUTOJA - DN2
                            from 20000523 to 20000529

                        Avail        Severe
  DN2 DN2                 (%)    Err    Err   Degr
index name       Dir   ava_7    sec    sec    min
----- ---------- --- ------- ------ ------ ------
    1 DN2_1        1   85.78     24     19      0
                   2  100.00      0      0      0
                   3   85.79      2      0      0
                   4  100.00      0      0      0
                   5  100.00      0      0      0
                   7  100.00      0      0      0
                   8  100.00      0      0      0
                   9  100.00      0      0      0
                  10  100.00      0      0      0
                  11  100.00      0      0      0
                  12  100.00      0      0      0
                  14   99.32      2      0      0
                  19  100.00      0      0      0
    3 DN2_3        1   91.57  97147  14431   1984
                   2  100.00      0      0      0

-



===============================================================================
=
=                                TRU
=
===============================================================================

Dir                       Direction
Avail (%)          /ava_8  Availability
Err sec            /c64002 The total duration of the errored seconds.
Err sec severe     /c64003 The total duration of the severely errored seconds.
BBE                /c64004 Background block errors. Errored block observed
.                          outside severely errored second

Measurement used: p_nbsc_tru_bie
Note: TRU should be ugraded at least to firmware version 02B to make measurment
work.

===============================================================================
```

BSC MERKURIUS - TRU
from 20000523 to 20000529

Host BCF name	TRU index	Dir	Avail (%) ava_7	Err sec	Severe Err sec	Degr min
KPN1	1	1	99.78	22	13	12521
		2	99.68	34	25	23091
KPN2	1	1	99.78	20	14	13160
		2	99.68	38	26	24049
KPN3	1	1	99.78	20	14	12854
		2	99.68	33	25	23023

BSC1KUTOJA - TRU
from 20000523 to 20000529

Host BCF name	TRU index	Dir	Avail (%) ava_7	Err sec	Severe Err sec	Degr min
KILO007	1	1	100.00	0	0	0
		2	100.00	0	0	0
KILONKALLI	1	1	100.00	0	0	0

```
================================================================================
=
=                              BSC-ET
=
================================================================================
```

```
ET type    /ET2E or ET2A
ET ind    /ET index
Ava (%)              /ava_10 Availability
Ava_R (%)            /ava_11 Availability, Remote end.
Err sec              /c65002 Duration of the errored seconds.
Err_R sec            /c65007 Duration of the errored seconds, Remote end.
Sev err sec          /c65003 Duration of the severely errored seconds.
Sev_R err sec        /c65008 Duration of the severely errored seconds, Remote end.
Deg min              /c65004 Duration of the degraded minutes.
Deg_R min            /c65009 Duration of the degraded minutes, Remote end.
```

BSC MERKURIUS- ET
from 20000523 to 20000529

ET ind	ET type	Ava (%) ava_10	Ava_R (%) ava_11	Err sec	Err_R sec	Sev err sec	Sev_R err sec	Deg min	Deg_R min
32	ET2E	74.40	100.00	0	0	0	0	0	0
33	ET2E	100.00	100.00	0	0	0	0	0	0
34	ET2E	100.00	100.00	0	0	0	0	0	0
36	ET2E	100.00	100.00	0	0	0	0	0	0
38	ET2E								
39	ET2E								
40	ET2E	74.44	100.00	0	0	0	0	0	0
41	ET2E	100.00	100.00	0	0	0	0	0	0
42	ET2E								
43	ET2E	100.00	100.00	0	0	0	0	0	0
44	ET2E								
46	ET2E	100.00	100.00	0	0	0	0	0	0
47	ET2E	100.00	100.00	0	0	0	0	0	0
49	ET2E	100.00	100.00	0	0	0	0	0	0
57	ET2E	99.92	100.00	0	0	0	0	0	0
58	ET2E	93.95	100.00	0	0	0	0	0	0
59	ET2E	93.95	100.00	0	0	0	0	0	0
60	ET2E	100.00	100.00	0	0	0	0	0	0

```
 62 ET2E  100.00  100.00      0      0      0      0     0     0
 63 ET2E   86.87  100.00      0      0      0      0     0     0


===============================================================================
=
=                             TCSM-ET
=
===============================================================================

ET type    /ET2E or ET2A
ET ind    /ET index
Ava (%)              /ava_12 Availability
Ava_R (%)            /ava_13 Availability, Remote end.
Err sec              /c66002 Duration of the errored seconds.
Err_R sec            /c66007 Duration of the errored seconds, Remote end.
Sev err sec          /c66003 Duration of the severely errored seconds.
Sev_R err sec        /c66008 Duration of the severely errored seconds, Remote end.
Deg min              /c66004 Duration of the degraded minutes.
Deg_R min            /c66009 Duration of the degraded minutes, Remote end.

                             BSC MERKURIUS-  TCSM ET
                            from 20000523 to 20000529

           Ava   Ava_R                    Sev  Sev_R
 ET ET     (%)     (%)    Err  Err_R     err    err   Deg Deg_R
ind type  ava_12  ava_13    sec    sec     sec    sec   min   min
--- ---- ------- ------- ------ ------ ------ ------ ----- -----
  0 ET2E  100.00  100.00     39     37      0      0     0     2
  1 ET2E  100.00  100.00      8      2      0      0     0     0
  2 ET2E  100.00  100.00      2      0      0      0     0     0

                              BSC1KUTOJA-  TCSM ET
                            from 20000523 to 20000529

           Ava   Ava_R                    Sev  Sev_R
 ET ET     (%)     (%)    Err  Err_R     err    err   Deg Deg_R
ind type  ava_12  ava_13    sec    sec     sec    sec   min   min
--- ---- ------- ------- ------ ------ ------ ------ ----- -----
  0 ET2E  100.00  100.00      4      7      0      0     0     2
  1 ET2E  100.00  100.00      0      0      0      0     0     0
```

Figure 90. Report 518: Transmission statistics

10.4 Transmission object profiles

To see more detailed profiles of each transmission object, run the following profile reports.

- DMR profile (515)
- DN2 profile (516)
- TRU profile (517)
- BSC ET profile (522)
- TCSM profile (523)

- TRE profile (525)
- TRE-SEL profile (526)

To see the availability and quality of radio relay equipment, run the report **DMR profile** (515).

```
===============================================================================

               DMR Profiles  BSC:BSC1KUTOJA  DMR parent:BSC1KUTOJA
                            from 20000515 to 20000515

                                                             RF in RF in
                                   Avail          Severe     min   max
DMR            DMR                 (%)       Err    Err  Degr lev   lev
name         index YYYYMMDD HH:MI ava_6     sec    sec   min (dBm) (dBm) Spec
------------ ----- -------- ----- ------ ------ ------ ------ ----- ----- -----
KUT-SUOS      1001 20000515 00:00 100.00      0      0      0   -38   -37 G.821
                   20000515 01:00 100.00      0      0      0   -38   -37
                   20000515 02:00 100.00      0      0      0   -38   -38
                   20000515 03:00 100.00      0      0      0   -39   -38
                   20000515 04:00 100.00      0      0      0   -39   -37
                   20000515 05:00 100.00      0      0      0   -38   -37
                   20000515 06:00 100.00      0      0      0   -39   -37
                   20000515 07:00 100.00      0      0      0   -38   -37
                   20000515 08:00 100.00      0      0      0   -39   -37
                   20000515 09:00 100.00      0      0      0   -39   -38
                   20000515 10:00 100.00      0      0      0   -38   -37
                   20000515 11:00 100.00      0      0      0   -38   -37
                   20000515 12:00 100.00      0      0      0   -38   -37
                   20000515 13:00 100.00      0      0      0   -38   -36
                   20000515 14:00 100.00      0      0      0   -38   -37
                   20000515 15:00 100.00      0      0      0   -38   -36
                   20000515 16:00 100.00      0      0      0   -38   -36
                   20000515 17:00 100.00      0      0      0   -38   -36
                   20000515 18:00 100.00      0      0      0   -37   -36
                   20000515 19:00 100.03      0      0      0   -38   -37
                   20000515 20:00  99.97      0      0      0   -38   -37
                   20000515 21:00 100.00      0      0      0   -39   -38
                   20000515 22:00 100.00      0      0      0   -39   -37
                   20000515 23:00 100.00      0      0      0   -39   -37
SUOS-KUT      1002 20000515 00:00 100.00      0      0      0   -35   -33 G.821
                   20000515 03:00 100.00      0      0      0   -33   -33
                   20000515 06:00 100.00      0      0      0   -34   -33
                   20000515 09:00 100.00      1      1      0   -35   -33
                   20000515 12:00 100.00      0      0      0   -33   -33
                   20000515 15:00 100.00      0      0      0   -33   -33
                   20000515 16:00 100.00      0      0      0   -33   -33
                   20000515 17:00 100.00      0      0      0   -33   -32
                   20000515 20:00 100.00      0      0      0   -34   -33
                   20000515 23:00 100.00      0      0      0   -34   -33
```

Figure 91. Report 515: DMR profile

To see the availability and quality of dynamic node equipment, run the report **DN2 profile** (516).

```
===============================================================================

                                BSC1KUTOJA - DN2
                            from 19991022 to 19991022
```

```
                                      Avail            Err
  DN2 DN2                               (%)     Err    sec    Degr
index name        Port YYYYMMDD HH:MI  ava_7    sec severe     min Spec
----- ---------- ---- -------- ----- ------- ------ ------ ------ -----
    1 DN2_1          1 19991022 00:00  100.00      0      0      0 G.821
                     1 19991022 01:00  100.00      0      0      0 G.821
                     1 19991022 03:00  100.00      0      0      0 G.821
                     1 19991022 05:00  100.00      0      0      0 G.821
                     1 19991022 07:00  100.00      0      0      0 G.821
                     1 19991022 09:00  100.00      0      0      0 G.821
                     1 19991022 11:00  100.00      0      0      0 G.821
                     1 19991022 13:00  100.00      0      0      0 G.821
                     1 19991022 14:00  100.00      0      0      0 G.821
                     1 19991022 12:00  100.00      0      0      0 G.821
                     1 19991022 10:00  100.00      0      0      0 G.821
                     1 19991022 08:00  100.00      0      0      0 G.821
                     1 19991022 06:00  100.00      0      0      0 G.821
                     1 19991022 04:00  100.00      0      0      0 G.821
                     1 19991022 02:00  100.00      0      0      0 G.821
                     2 19991022 00:00  100.00      0      0      0 G.821
                     2 19991022 14:00  100.00      0      0      0 G.821
                     2 19991022 13:00  100.00      0      0      0 G.821
                     2 19991022 12:00  100.00      0      0      0 G.821
```

Figure 92. Report 516: DN2 profile

To see the availability and quality of top rack unit equipment, run the report **TRU profile** (517).

```
===============================================================================
                              TRU Profiles BSC1KUTOJA
                             from 19991122 to 19991122

                                        Avail            Err Backgr
Host BCF        TRU                       (%)     Err    sec  block
name          index Dir YYYYMMDD HH:MI  ava_8     sec severe errors Spec
------------- ----- --- -------- ----- ------- ------ ------ ------ -----
KILO007           1   1 19991122 09:00   99.97      0      0      0 G.826
```

Figure 93. Report 517: TRU profile

To see the BSC ET availability and quality , run report (522). By using the filtering you may focus on abnormalities only.

```
===============================================================================
=
=                        BSC ET PROFILE
=
=                   Network:          PLMN
=                   BSC:              BSC1KUTOJA
=                   Period:           from 19991104 to 19991104
=                   Time aggregation: hour
=                   Filtering:        All shown
=
===============================================================================

Measurement used: p_nbsc_et_bsc
```

```
===============================================================================
-
===============================================================================
=
=                   BSC-ET. Availability and quality
=
=                   Filtering:        All shown
=
===============================================================================

ET type   /ET2E or ET2A
ET ind   /ET index

Ava (%)             /ava_10 Availability
Ava_R (%)           /ava_11 Availability, Remote end.
Err sec             /c65002 Duration of the errored seconds.
Err_R sec           /c65007 Duration of the errored seconds, Remote end.
Sev err sec         /c65003 Duration of the severely errored seconds.
Sev_R err sec       /c65008 Duration of the severely errored seconds, Remote end.

Deg min             /c65004 Duration of the degraded minutes.
Deg_R min           /c65009 Duration of the degraded minutes, Remote end.

                                BSC1KUTOJA-  ET
                           from 19991104 to 19991104

                           Ava   Ava_R                     Sev  Sev_R
                ET ET      (%)     (%)    Err  Err_R    err    err   Deg Deg_R
YYYYMMDD HH:MI ind type  ava_10  ava_11    sec    sec    sec    sec   min   min
-------- ----- --- ---- ------- ------- ------ ------ ------ ------ ----- -----
19991104 00:00  32 ET2E  100.00  100.00      0      0      0      0     0     0
19991104 01:00           100.00  100.00      0      0      0      0     0     0
19991104 02:00           100.00  100.00      0      0      0      0     0     0
19991104 03:00           100.00  100.00      0      0      0      0     0     0
19991104 04:00           100.00  100.00      0      0      0      0     0     0
19991104 05:00           100.00  100.00      0      0      0      0     0     0
19991104 06:00           100.00  100.00      0      0      0      0     0     0
19991104 07:00           100.00  100.00      0      0      0      0     0     0
19991104 08:00           100.00  100.00      0      0      0      0     0     0
19991104 09:00           100.00  100.00      0      0      0      0     0     0
19991104 10:00           100.00  100.00      0      0      0      0     0     0
19991104 11:00           100.00  100.00      0      0      0      0     0     0
19991104 12:00           100.00  100.00      0      0      0      0     0     0
19991104 13:00           100.00  100.00      0      0      0      0     0     0
19991104 14:00           100.00  100.00      0      0      0      0     0     0
19991104 15:00           100.00  100.00      0      0      0      0     0     0
19991104 00:00  36 ET2E  100.00  100.00      0      0      0      0     0     0
19991104 01:00           100.00  100.00      0      0      0      0     0     0
19991104 02:00           100.00  100.00      0      0      0      0     0     0
19991104 03:00           100.00  100.00      0      0      0      0     0     0
19991104 04:00           100.00  100.00      0      0      0      0     0     0
19991104 05:00           100.00  100.00      0      0      0      0     0     0
19991104 06:00           100.00  100.00      0      0      0      0     0     0
19991104 07:00           100.00  100.00      0      0      0      0     0     0
19991104 08:00           100.00  100.00      0      0      0      0     0     0
19991104 09:00           100.00  100.00      0      0      0      0     0     0
19991104 10:00           100.00  100.00      0      0      0      0     0     0
19991104 11:00           100.00  100.00      0      0      0      0     0     0
19991104 12:00           100.00  100.00      0      0      0      0     0     0
19991104 13:00           100.00  100.00      0      0      0      0     0     0
19991104 14:00           100.00  100.00      0      0      0      0     0     0
19991104 15:00           100.00  100.00      0      0      0      0     0     0
19991104 00:00  37 ET2E  100.00  100.00      0      0      0      0     0     0
19991104 01:00           100.00  100.00      0      0      0      0     0     0
19991104 02:00           100.00  100.00      0      0      0      0     0     0
19991104 03:00           100.00  100.00      0      0      0      0     0     0
19991104 04:00           100.00  100.00      0      0      0      0     0     0
```

19991104	05:00			100.00	100.00	0	0	0	0	0	0
19991104	06:00			100.00	100.00	0	0	0	0	0	0
19991104	07:00			100.00	100.00	0	0	0	0	0	0
19991104	08:00			100.00	100.00	0	0	0	0	0	0
19991104	09:00			100.00	100.00	0	0	0	0	0	0
19991104	10:00			100.00	100.00	0	0	0	0	0	0
19991104	11:00			100.00	100.00	0	0	0	0	0	0
19991104	12:00			100.00	100.00	0	0	0	0	0	0
19991104	13:00			100.00	100.00	0	0	0	0	0	0

BSC1KUTOJA- ET
from 19991104 to 19991104

YYYYMMDD	HH:MI	ET ind	ET type	Ava (%) ava_10	Ava_R (%) ava_11	Err sec	Err_R sec	Sev err sec	Sev_R err sec	Deg min	Deg_R min
19991104	14:00	37	ET2E	100.00	100.00	0	0	0	0	0	0
19991104	15:00			100.00	100.00	0	0	0	0	0	0
19991104	00:00	40	ET2E	100.00	100.00	0	0	0	0	0	0
19991104	01:00			100.00	100.00	0	0	0	0	0	0
19991104	02:00			100.00	100.00	0	0	0	0	0	0
19991104	03:00			100.00	100.00	0	0	0	0	0	0
19991104	04:00			100.00	100.00	0	0	0	0	0	0
19991104	05:00			100.00	100.00	0	0	0	0	0	0
19991104	06:00			100.00	100.00	0	0	0	0	0	0
19991104	07:00			100.00	100.00	0	0	0	0	0	0
19991104	08:00			100.00	100.00	0	0	0	0	0	0
19991104	09:00			100.00	100.00	0	0	0	0	0	0
19991104	10:00			100.00	100.00	0	0	0	0	0	0
19991104	11:00			100.00	100.00	0	0	0	0	0	0
19991104	12:00			100.00	100.00	0	0	0	0	0	0
19991104	13:00			100.00	100.00	0	0	0	0	0	0
19991104	14:00			100.00	100.00	0	0	0	0	0	0
19991104	15:00			100.00	100.00	0	0	0	0	0	0

64 rows selected.

```
-
================================================================================
=
=                   BSC-ET. Missing signals and frame alignments.
=
================================================================================
```

```
Inc sign mis 1      /c65010 Nbr of missing incoming signals, class 1.
Inc sign mis 2      /c65011 Nbr of missing incoming signals, class 2.
Inc sign mis 3      /c65012 Nbr of missing incoming signals, class 3.
Inc sign mis 4      /c65013 Nbr of missing incoming signals, class 4.
FA lost 1           /c65014 Nbr of lost frame alignments, class 1.
FA lost 2           /c65015 Nbr of lost frame alignments, class 2.
FA lost 3           /c65016 Nbr of lost frame alignments, class 3.
FA lost 4           /c65017 Nbr of lost frame alignments, class 4.
```

BSC1KUTOJA- ET
from 19991104 to 19991104

YYYYMMDD	HH:MI	ET ind	ET type	Inc sign mis 1	Inc sign mis 2	Inc sign mis 3	Inc sign mis 4	FA lost 1	FA lost 2	FA lost 3	FA lost 4
19991104	00:00	32	ET2E	0	0	0	0	0	0	0	0
19991104	01:00			0	0	0	0	0	0	0	0
19991104	02:00			0	0	0	0	0	0	0	0
19991104	03:00			0	0	0	0	0	0	0	0
19991104	04:00			0	0	0	0	0	0	0	0
19991104	05:00			0	0	0	0	0	0	0	0
19991104	06:00			0	0	0	0	0	0	0	0

```
19991104 07:00                0      0      0      0      0      0      0      0
19991104 08:00                0      0      0      0      0      0      0      0
19991104 09:00                0      0      0      0      0      0      0      0
19991104 10:00                0      0      0      0      0      0      0      0
19991104 11:00                0      0      0      0      0      0      0      0
19991104 12:00                0      0      0      0      0      0      0      0
19991104 13:00                0      0      0      0      0      0      0      0
19991104 14:00                0      0      0      0      0      0      0      0
19991104 15:00                0      0      0      0      0      0      0      0
19991104 00:00  36 ET2E       0      0      0      0      0      0      0      0
19991104 01:00                0      0      0      0      0      0      0      0
19991104 02:00                0      0      0      0      0      0      0      0
19991104 03:00                0      0      0      0      0      0      0      0
19991104 04:00                0      0      0      0      0      0      0      0
19991104 05:00                0      0      0      0      0      0      0      0
19991104 06:00                0      0      0      0      0      0      0      0
19991104 07:00                0      0      0      0      0      0      0      0
19991104 08:00                0      0      0      0      0      0      0      0
19991104 09:00                0      0      0      0      0      0      0      0
19991104 10:00                0      0      0      0      0      0      0      0
19991104 11:00                0      0      0      0      0      0      0      0
19991104 12:00                0      0      0      0      0      0      0      0
19991104 13:00                0      0      0      0      0      0      0      0
19991104 14:00                0      0      0      0      0      0      0      0
19991104 15:00                0      0      0      0      0      0      0      0
19991104 00:00  37 ET2E       0      0      0      0      0      0      0      0
19991104 01:00                0      0      0      0      0      0      0      0
19991104 02:00                0      0      0      0      0      0      0      0
19991104 03:00                0      0      0      0      0      0      0      0
19991104 04:00                0      0      0      0      0      0      0      0
19991104 05:00                0      0      0      0      0      0      0      0
19991104 06:00                0      0      0      0      0      0      0      0
19991104 07:00                0      0      0      0      0      0      0      0
19991104 08:00                0      0      0      0      0      0      0      0
19991104 09:00                0      0      0      0      0      0      0      0
19991104 10:00                0      0      0      0      0      0      0      0
19991104 11:00                0      0      0      0      0      0      0      0
19991104 12:00                0      0      0      0      0      0      0      0
19991104 13:00                0      0      0      0      0      0      0      0

                                    BSC1KUTOJA-  ET
                                from 19991104 to 19991104

                           Inc    Inc    Inc    Inc     FA     FA     FA     FA
                ET ET     sign   sign   sign   sign   lost   lost   lost   lost
YYYYMMDD HH:MI ind type  mis 1  mis 2  mis 3  mis 4      1      2      3      4
-------- ----- --- ---- ------ ------ ------ ------ ------ ------ ------ ------
19991104 14:00  37 ET2E       0      0      0      0      0      0      0      0
19991104 15:00                0      0      0      0      0      0      0      0
19991104 00:00  40 ET2E       0      0      0      0      0      0      0      0
19991104 01:00                0      0      0      0      0      0      0      0
19991104 02:00                0      0      0      0      0      0      0      0
19991104 03:00                0      0      0      0      0      0      0      0
19991104 04:00                0      0      0      0      0      0      0      0
19991104 05:00                0      0      0      0      0      0      0      0
19991104 06:00                0      0      0      0      0      0      0      0
19991104 07:00                0      0      0      0      0      0      0      0
19991104 08:00                0      0      0      0      0      0      0      0
19991104 09:00                0      0      0      0      0      0      0      0
19991104 10:00                0      0      0      0      0      0      0      0
19991104 11:00                0      0      0      0      0      0      0      0
19991104 12:00                0      0      0      0      0      0      0      0
19991104 13:00                0      0      0      0      0      0      0      0
19991104 14:00                0      0      0      0      0      0      0      0
19991104 15:00                0      0      0      0      0      0      0      0

64 rows selected.
```

```
-
==============================================================================
=
=                   BSC-ET. Alarm indications.
=
==============================================================================
AIS rec 1           /c65018 Nbr of alarm indication signals, class 1.
AIS rec 2           /c65019 Nbr of alarm indication signals, class 2.
AIS rec 3           /c65020 Nbr of alarm indication signals, class 3.
AIS rec 4           /c65021 Nbr of alarm indication signals, class 4.
Ala 1               /c65022 Nbr of alarms from the remote end, class 1.
Ala 2               /c65023 Nbr of alarms from the remote end, class 2.
Ala 3               /c65024 Nbr of alarms from the remote end, class 3.
Ala 4               /c65025 Nbr of alarms from the remote end, class 4.

                                BSC1KUTOJA-  ET
                           from 19991104 to 19991104

                ET ET      AIS    AIS    AIS    AIS
YYYYMMDD HH:MI ind type  rec 1  rec 2  rec 3  rec 4  Ala 1  Ala 2  Ala 3  Ala 4
-------- ----- --- ---- ------ ------ ------ ------ ------ ------ ------ ------
19991104 00:00  32 ET2E      0      0      0      0      0      0      0      0
19991104 01:00               0      0      0      0      0      0      0      0
19991104 02:00               0      0      0      0      0      0      0      0
19991104 03:00               0      0      0      0      0      0      0      0
19991104 04:00               0      0      0      0      0      0      0      0
19991104 05:00               0      0      0      0      0      0      0      0
19991104 06:00               0      0      0      0      0      0      0      0
19991104 07:00               0      0      0      0      0      0      0      0
19991104 08:00               0      0      0      0      0      0      0      0
19991104 09:00               0      0      0      0      0      0      0      0
19991104 10:00               0      0      0      0      0      0      0      0
19991104 11:00               0      0      0      0      0      0      0      0
19991104 12:00               0      0      0      0      0      0      0      0
19991104 13:00               0      0      0      0      0      0      0      0
19991104 14:00               0      0      0      0      0      0      0      0
19991104 15:00               0      0      0      0      0      0      0      0
19991104 00:00  36 ET2E      0      0      0      0      0      0      0      0
19991104 01:00               0      0      0      0      0      0      0      0
19991104 02:00               0      0      0      0      0      0      0      0
19991104 03:00               0      0      0      0      0      0      0      0
19991104 04:00               0      0      0      0      0      0      0      0
19991104 05:00               0      0      0      0      0      0      0      0
19991104 06:00               0      0      0      0      0      0      0      0
19991104 07:00               0      0      0      0      0      0      0      0
19991104 08:00               0      0      0      0      0      0      0      0
19991104 09:00               0      0      0      0      0      0      0      0
19991104 10:00               0      0      0      0      0      0      0      0
19991104 11:00               0      0      0      0      0      0      0      0
19991104 12:00               0      0      0      0      0      0      0      0
19991104 13:00               0      0      0      0      0      0      0      0
19991104 14:00               0      0      0      0      0      0      0      0
19991104 15:00               0      0      0      0      0      0      0      0
19991104 00:00  37 ET2E      0      0      0      0      0      0      0      0
19991104 01:00               0      0      0      0      0      0      0      0
19991104 02:00               0      0      0      0      0      0      0      0
19991104 03:00               0      0      0      0      0      0      0      0
19991104 04:00               0      0      0      0      0      0      0      0
19991104 05:00               0      0      0      0      0      0      0      0
19991104 06:00               0      0      0      0      0      0      0      0
19991104 07:00               0      0      0      0      0      0      0      0
19991104 08:00               0      0      0      0      0      0      0      0
19991104 09:00               0      0      0      0      0      0      0      0
19991104 10:00               0      0      0      0      0      0      0      0
19991104 11:00               0      0      0      0      0      0      0      0
19991104 12:00               0      0      0      0      0      0      0      0
19991104 13:00               0      0      0      0      0      0      0      0
19991104 14:00               0      0      0      0      0      0      0      0
```

```
                           BSC1KUTOJA-  ET
                     from 19991104 to 19991104

                ET ET      AIS    AIS    AIS    AIS
YYYYMMDD HH:MI ind type  rec 1  rec 2  rec 3  rec 4  Ala 1  Ala 2  Ala 3  Ala 4
-------- ----- --- ---- ------ ------ ------ ------ ------ ------ ------ ------
19991104 15:00  37 ET2E      0      0      0      0      0      0      0      0
19991104 00:00  40 ET2E      0      0      0      0      0      0      0      0
19991104 01:00               0      0      0      0      0      0      0      0
19991104 02:00               0      0      0      0      0      0      0      0
19991104 03:00               0      0      0      0      0      0      0      0
19991104 04:00               0      0      0      0      0      0      0      0
19991104 05:00               0      0      0      0      0      0      0      0
19991104 06:00               0      0      0      0      0      0      0      0
19991104 07:00               0      0      0      0      0      0      0      0
19991104 08:00               0      0      0      0      0      0      0      0
19991104 09:00               0      0      0      0      0      0      0      0
19991104 10:00               0      0      0      0      0      0      0      0
19991104 11:00               0      0      0      0      0      0      0      0
19991104 12:00               0      0      0      0      0      0      0      0
19991104 13:00               0      0      0      0      0      0      0      0
19991104 14:00               0      0      0      0      0      0      0      0
19991104 15:00               0      0      0      0      0      0      0      0

64 rows selected.

-
===============================================================================
=
=                   BSC-ET.  Frame errors and slips
=
===============================================================================
FA err 1            /c65026 Nbr of frame alignment signal errors, class 1.
FA err 2            /c65027 Nbr of frame alignment signal errors, class 2.
FA err 3            /c65028 Nbr of frame alignment signal errors, class 3.
FA err 4            /c65029 Nbr of frame alignment signal errors, class 4.
Neg slip            /c65030 Nbr of negative slips.
Pos slip            /c65031 Nbr of positive slips.

                           BSC1KUTOJA-  ET
                     from 19991104 to 19991104

                ET ET       FA     FA     FA     FA    Neg    Pos
YYYYMMDD HH:MI ind type  err 1  err 2  err 3  err 4   slip   slip
-------- ----- --- ---- ------ ------ ------ ------ ------ ------
19991104 00:00  32 ET2E      0      0      0      0      0      0
19991104 01:00               0      0      0      0      0      0
19991104 02:00               0      0      0      0      0      0
19991104 03:00               0      0      0      0      0      0
19991104 04:00               0      0      0      0      0      0
19991104 05:00               0      0      0      0      0      0
19991104 06:00               0      0      0      0      0      0
19991104 07:00               0      0      0      0      0      0
19991104 08:00               0      0      0      0      0      0
19991104 09:00               0      0      0      0      0      0
19991104 10:00               0      0      0      0      0      0
19991104 11:00               0      0      0      0      0      0
19991104 12:00               0      0      0      0      0      0
19991104 13:00               0      0      0      0      0      0
19991104 14:00               0      0      0      0      0      0
19991104 15:00               0      0      0      0      0      0
19991104 00:00  36 ET2E      0      0      0      0      0      0
19991104 01:00               0      0      0      0      0      0
19991104 02:00               0      0      0      0      0      0
19991104 03:00               0      0      0      0      0      0
19991104 04:00               0      0      0      0      0      0
19991104 05:00               0      0      0      0      0      0
```

```
19991104 06:00                 0       0       0       0       0       0
19991104 07:00                 0       0       0       0       0       0
19991104 08:00                 0       0       0       0       0       0
19991104 09:00                 0       0       0       0       0       0
19991104 10:00                 0       0       0       0       0       0
19991104 11:00                 0       0       0       0       0       0
19991104 12:00                 0       0       0       0       0       0
19991104 13:00                 0       0       0       0       0       0
19991104 14:00                 0       0       0       0       0       0
19991104 15:00                 0       0       0       0       0       0
19991104 00:00  37 ET2E        0       0       0       0       0       0
19991104 01:00                 0       0       0       0       0       0
19991104 02:00                 0       0       0       0       0       0
19991104 03:00                 0       0       0       0       0       0
19991104 04:00                 0       0       0       0       0       0
19991104 05:00                 0       0       0       0       0       0
19991104 06:00                 0       0       0       0       0       0
19991104 07:00                 0       0       0       0       0       0
19991104 08:00                 0       0       0       0       0       0
19991104 09:00                 0       0       0       0       0       0
19991104 10:00                 0       0       0       0       0       0
19991104 11:00                 0       0       0       0       0       0
19991104 12:00                 0       0       0       0       0       0
19991104 13:00                 0       0       0       0       0       0
19991104 14:00                 0       0       0       0       0       0

                                    BSC1KUTOJA-  ET
                               from 19991104 to 19991104

                 ET ET        FA      FA      FA      FA     Neg     Pos
YYYYMMDD HH:MI ind type   err 1   err 2   err 3   err 4    slip    slip
-------- ----- --- ---- ------ ------ ------ ------ ------ ------
19991104 15:00  37 ET2E        0       0       0       0       0       0
19991104 00:00  40 ET2E        0       0       0       0       0       0
19991104 01:00                 0       0       0       0       0       0
19991104 02:00                 0       0       0       0       0       0
19991104 03:00                 0       0       0       0       0       0
19991104 04:00                 0       0       0       0       0       0
19991104 05:00                 0       0       0       0       0       0
19991104 06:00                 0       0       0       0       0       0
19991104 07:00                 0       0       0       0       0       0
19991104 08:00                 0       0       0       0       0       0
19991104 09:00                 0       0       0       0       0       0
19991104 10:00                 0       0       0       0       0       0
19991104 11:00                 0       0       0       0       0       0
19991104 12:00                 0       0       0       0       0       0
19991104 13:00                 0       0       0       0       0       0
19991104 14:00                 0       0       0       0       0       0
19991104 15:00                 0       0       0       0       0       0
```

Figure 94. Report 522: BSC ET profile

To see the TCSM ET availability and quality, run report (523). By using the filtering you may focus on abnormalities only.

```
===============================================================================
=
=                          TCSM ET PROFILE
=
=                    Network:           PLMN
=                    BSC:               all BSC
=                    Period:            from 19991116 to 19991116
=                    Time aggregation:  hour
=                    Filtering:         Only abnormal hours shown
```

```
=
================================================================================

Measurement used: p_nbsc_et_tcsm

================================================================================
-
================================================================================
=
=                      TCSM-ET. Availability and quality
=
================================================================================

ET type   /ET2E or ET2A
ET ind    /ET index

Ava (%)              /ava_12  Availability
Ava_R (%)            /ava_13  Availability, Remote end.
Err sec              /c66002 Duration of the errored seconds.
Err_R sec            /c66007 Duration of the errored seconds, Remote end.
Sev err sec          /c66003 Duration of the severely errored seconds.
Sev_R err sec        /c66008 Duration of the severely errored seconds, Remote end.
Deg min              /c66004 Duration of the degraded minutes.
Deg_R min            /c66009 Duration of the degraded minutes, Remote end.
```

BSC3TRE- TCSM ET
from 19991116 to 19991116

YYYYMMDD	HH:MI	ET ind	ET type	Ava (%) ava_12	Ava_R (%) ava_13	Err sec	Err_R sec	Sev err sec	Sev_R err sec	Deg min	Deg_R min
19991116	00:00	0	ET2E	100.00	100.00	0	0	0	0	0	0
19991116	02:00			100.00	100.00	0	0	0	0	0	0
19991116	04:00			100.00	100.00	0	0	0	0	0	0
19991116	06:00			100.00	100.00	0	0	0	0	0	0
19991116	08:00			100.00	100.00	0	0	0	0	0	0
19991116	13:00			100.00	100.00	0	0	0	0	0	0
19991116	14:00			100.00	100.00	0	0	0	0	0	0

BSC4TRE- TCSM ET
from 19991116 to 19991116

YYYYMMDD	HH:MI	ET ind	ET type	Ava (%) ava_12	Ava_R (%) ava_13	Err sec	Err_R sec	Sev err sec	Sev_R err sec	Deg min	Deg_R min
19991116	02:00	0	ET2E	100.00	100.00	0	0	0	0	0	0
19991116	03:00			100.00	100.00	0	0	0	0	0	0
19991116	04:00			100.00	100.00	0	0	0	0	0	0
19991116	05:00			100.00	100.00	0	0	0	0	0	0
19991116	06:00			100.00	100.00	0	0	0	0	0	0
19991116	07:00			100.00	100.00	0	0	0	0	0	0
19991116	08:00			100.00	100.00	0	0	0	0	0	0
19991116	09:00			100.00	100.00	0	0	0	0	0	0
19991116	10:00			100.00	100.00	0	0	0	0	0	0
19991116	11:00			100.00	100.00	0	0	0	0	0	0
19991116	12:00			100.00	100.00	0	0	0	0	0	0
19991116	13:00			100.00	100.00	0	0	0	0	0	0
19991116	14:00			100.00	100.00	0	0	0	0	0	0

```
20 rows selected.

-
================================================================================
=
=              TCSM-ET. Missing signals and frame alignments.
=
```

```
================================================================================

Inc sign mis 1      /c66010 Nbr. of missing incoming signals, class 1.
Inc sign mis 2      /c66011 Nbr. of missing incoming signals, class 2.
Inc sign mis 3      /c66012 Nbr. of missing incoming signals, class 3.
Inc sign mis 4      /c66013 Nbr. of missing incoming signals, class 4.
FA lost 1           /c66014 Nbr. of lost frame alignments, class 1.
FA lost 2           /c66015 Nbr. of lost frame alignments, class 2.
FA lost 3           /c66016 Nbr. of lost frame alignments, class 3.
FA lost 4           /c          /c66015 Nbr. of lost frame alignments, class 2.
FA lost 3           /c66016 Nbr. of lost frame alignments, class 3.
FA lost 4           /c66017 Nbr. of lost frame alignments, class 4.

                                  BSC3TRE-  TCSM ET
                              from 19991116 to 19991116

                               Inc    Inc    Inc    Inc     FA     FA     FA     FA
                     ET ET    sign   sign   sign   sign   lost   lost   lost   lost
YYYYMMDD HH:MI ind type  mis 1  mis 2  mis 3  mis 4      1      2      3      4
-------- ----- --- ---- ------ ------ ------ ------ ------ ------ ------ ------
19991116 00:00   0 ET2E      0      0      0      0      0      0      0      0
19991116 02:00               0      0      0      0      0      0      0      0
19991116 04:00               0      0      0      0      0      0      0      0
19991116 06:00               0      0      0      0      0      0      0      0
19991116 08:00               0      0      0      0      0      0      0      0
19991116 13:00               0      0      0      0      0      0      0      0
19991116 14:00               0      0      0      0      0      0      0      0

                                  BSC4TRE-  TCSM ET
                              from 19991116 to 19991116

                               Inc    Inc    Inc    Inc     FA     FA     FA     FA
                     ET ET    sign   sign   sign   sign   lost   lost   lost   lost
YYYYMMDD HH:MI ind type  mis 1  mis 2  mis 3  mis 4      1      2      3      4
-------- ----- --- ---- ------ ------ ------ ------ ------ ------ ------ ------
19991116 02:00   0 ET2E      0      0      0      0      0      0      0      0
19991116 03:00               0      0      0      0      0      0      0      0
19991116 04:00               0      0      0      0      0      0      0      0
19991116 05:00               0      0      0      0      0      0      0      0
19991116 06:00               0      0      0      0      0      0      0      0
19991116 07:00               0      0      0      0      0      0      0      0
19991116 08:00               0      0      0      0      0      0      0      0
19991116 09:00               0      0      0      0      0      0      0      0
19991116 10:00               0      0      0      0      0      0      0      0
19991116 11:00               0      0      0      0      0      0      0      0
19991116 12:00               0      0      0      0      0      0      0      0
19991116 13:00               0      0      0      0      0      0      0      0
19991116 14:00               0      0      0      0      0      0      0      0

20 rows selected.

-
================================================================================
=
=                      TCSM-ET. Alarm indications.
=
================================================================================

AIS rec 1           /c66018 Nbr. of alarm indication signals, class 1.
AIS rec 2           /c66019 Nbr. of alarm indication signals, class 2.
AIS rec 3           /c66020 Nbr. of alarm indication signals, class 3.
AIS rec 4           /c66021 Nbr. of alarm indication signals, class 4.
Ala 1               /c66022 Nbr. of alarms from the remote end, class 1.
Ala 2               /c66023 Nbr. of alarms from the remote end, class 2.
Ala 3               /c66024 Nbr. of alarms from the remote end, class 3.
Ala 4               /c66025 Nbr. of alarms from the remote end, class 4.

                                  BSC3TRE-  TCSM ET
```

from 19991116 to 19991116

YYYYMMDD	HH:MI	ET ind	ET type	AIS rec 1	AIS rec 2	AIS rec 3	AIS rec 4	Ala 1	Ala 2	Ala 3	Ala 4
19991116	00:00	0	ET2E	0	0	0	0	0	0	0	0
19991116	02:00			0	0	0	0	0	0	0	0
19991116	04:00			0	0	0	0	0	0	0	0
19991116	06:00			0	0	0	0	0	0	0	0
19991116	08:00			0	0	0	0	0	0	0	0
19991116	13:00			0	0	0	0	0	0	0	0
19991116	14:00			0	0	0	0	0	0	0	0

BSC4TRE- TCSM ET
from 19991116 to 19991116

YYYYMMDD	HH:MI	ET ind	ET type	AIS rec 1	AIS rec 2	AIS rec 3	AIS rec 4	Ala 1	Ala 2	Ala 3	Ala 4
19991116	02:00	0	ET2E	0	0	0	0	0	0	0	0
19991116	03:00			0	0	0	0	0	0	0	0
19991116	04:00			0	0	0	0	0	0	0	0
19991116	05:00			0	0	0	0	0	0	0	0
19991116	06:00			0	0	0	0	0	0	0	0
19991116	07:00			0	0	0	0	0	0	0	0
19991116	08:00			0	0	0	0	0	0	0	0
19991116	09:00			0	0	0	0	0	0	0	0
19991116	10:00			0	0	0	0	0	0	0	0
19991116	11:00			0	0	0	0	0	0	0	0
19991116	12:00			0	0	0	0	0	0	0	0
19991116	13:00			0	0	0	0	0	0	0	0
19991116	14:00			0	0	0	0	0	0	0	0

20 rows selected.

```
-
==============================================================================
=
=                    TCSM-ET. Frame errors and slips.
=
==============================================================================
```

```
FA err 1            /c66026 Nbr. of frame alignment signal errors, class 1.
FA err 2            /c66027 Nbr. of frame alignment signal errors, class 2.
FA err 3            /c66028 Nbr. of frame alignment signal errors, class 3.
FA err 4            /c66029 Nbr. of frame alignment signal errors, class 4.
Neg slip            /c66030 Nbr. of negative slips.
Pos slip            /c66031 Nbr. of positive slips.
```

BSC3TRE- TCSM ET
from 19991116 to 19991116

YYYYMMDD	HH:MI	ET ind	ET type	FA err 1	FA err 2	FA err 3	FA err 4	Neg slip	Pos slip
19991116	00:00	0	ET2E	0	0	0	0	66	0
19991116	02:00			0	0	0	0	223	47
19991116	04:00			0	0	0	0	204	31
19991116	06:00			0	0	0	0	74	69
19991116	08:00			0	0	0	0	6	0
19991116	13:00			0	0	0	0	27	39
19991116	14:00			0	0	0	0	27	39

BSC4TRE- TCSM ET
from 19991116 to 19991116

YYYYMMDD	HH:MI	ET ind	ET type	FA err 1	FA err 2	FA err 3	FA err 4	Neg slip	Pos slip

```
-------- ----- --- ---- ------ ------ ------ ------ ------ ------
19991116 02:00   0 ET2E      0      0      0      0     16     14
19991116 03:00               0      0      0      0     46     42
19991116 04:00               0      0      0      0     32     28
19991116 05:00               0      0      0      0     30     28
19991116 06:00               0      0      0      0     32     28
19991116 07:00               0      0      0      0     30     28
19991116 08:00               0      0      0      0     32     28
19991116 09:00               0      0      0      0     30     28
19991116 10:00               0      0      0      0     60     30
19991116 11:00               0      0      0      0    178     30
19991116 12:00               0      0      0      0    152     28
19991116 13:00               0      0      0      0    150     28
19991116 14:00               0      0      0      0    152     28
```

Figure 95. Report 523: BSC TCSM profile

To see statistics about Q1 generation transmission elements, run the report **TRE profile** (525):

```
===============================================================================
                           TRE Profiles BSC MERKURIUS
                            from 20000302 to 20000608

BCF name
TRE name                     Avail           Err Backgr
Q1 address    EI-FE-SB         (%)    Err    sec  block    Err
TRE type      TRX          ava_14    sec severe errors blocks
------------- -------- ------- ------ ------ ------ ------
LAB3          1-1-1      98.06      0      0      0      0
LAB3
1:4080
FXC E1 Asymm

M11                       0.00      0      0      0      0
MERKURIUS2
1:4080
FXC E1 Asymm
```

Figure 96. Report 525: TRE profile

To see statistics about Q1 generation transmission elements related to the feature BSS8120, run the report **TRE-SEL profile** (526):

```
===============================================================================
                           TRE Profiles BSC MERKURIUS
                            from 20001127 to 20001127

BCF name
TRE name                     Avail           Err Backgr
Q1 address    EI-FE-SB         (%)    Err    sec  block    Err
TRE type      TRX          ava_20    sec severe errors blocks
------------- -------- ------- ------ ------ ------ ------
              202-1-1     0.00      0      0      0      0

2:202
Hopper RRIC

                           TRE Profiles BSC MERKURIUS
```

```
                             from 20001127 to 20001127

BCF name
TRE name                        Avail           Err Backgr
Q1 address     EI-FE-SB           (%)    Err     sec  block    Err
TRE type       TRX             ava_20    sec  severe errors blocks
-------------  --------  -------  ------  ------  ------  ------
               202-2-1        0.00      0       0      0       0

2:202
Hopper RRIC
```

Figure 97. Report 526: TRE-SEL profile

11 Network element availability

The quality of the network elements can be measured as their *availability,* which in turn is basically affected by actions taken by the user and by faults.

11.1 Availability of transceivers

11.1.1 Availability of transceivers on BSC level

For the availability of TRXs on the BSC level, run the report **Unavailability classification per BSC** (131).

```
===============================================================================

This report shows for each BSC in the network:

Unava. due to user (%)            /uav_4  Share of unavailability caused by user..

Unava. due to int. (%)            /uav_5  -"- caused by internal reasons
Unava. due to ext. (%)            /uav_6  -"- caused by external reasons
Unava. TRX time due to user (min) /uav_7  TRX unavailability time caused by user.

Unava. TRX time due to int. (min) /uav_8  -"- caused by internal reasons
Unava. TRX time due to ext. (min) /uav_9  -"- caused by external reasons

Measurement used: p_nbsc_res_avail


===============================================================================
                                            Unava.    Unava.    Unava.
                 Unava.    Unava.    Unava. TRX time  TRX time  TRX time
                 due to    due to    due to   due to    due to    due to
                   user int.cause ext.cause     user int.cause ext.cause
BSC                 (%)       (%)       (%)    (min)     (min)     (min)
--------------- ------- --------- --------- -------- --------- ---------
BSC1KUTOJA        68.77     31.23      0.00    31717     14404         0
```

Figure 98. Report 131: Unavailability classification per BSC

11.2 Availability of time slots

BSS Network Doctor provides some reports which can be used to check the availability of time slots. However, on the cell level it is difficult to distinguish whether the unavailability is due to the user or to a fault. On the cell level, examining the alarms is the only means to try to separate these two cases to some extent.

11.2.1 Availability of SDCCH and TCH on area level

To find about the availability of SDCCH and TCH on the area level, run the report **Performance statistics (benchmark)** (200).

Day MMDD	SDCCH avail (%) ava_4	SDCCH congst (min) cngt_2	SDCCH usage (%) trf_7b	SDCCH seiz att c1000		SDCCH HO seiz (%) trf_33	SDCCH assign (%) trf_34	SDCCH block (%) blck_5a	To FCS (%) trf_38
tue 1121	75.89	0.0	0.0	10101	==>	0.00	99.98	0.02	0.00
mon 1120	74.75	0.0	0.0	9704	==>	0.00	99.95	0.05	0.00
sun 1119	73.14	0.0	0.0	4514	==>	0.00	100.00	0.00	0.00

Day MMDD	TCH avail (%) ava_1d	TCH congst (min) cngt_2	TCH call req trf_18a		Succ DR out (%) dr_6	TCH call block (%) blck_8d	TCH seiz qd (%) que_1a	TCH seiz non qd (%) que_7
tue 1121	64.67	0.00	1062	==>	0.00	0.00	0.00	100.00
mon 1120	63.76	0.23	1187	==>	0.00	0.00	0.00	100.00
sun 1119	62.24	0.00	28	==>	0.00	0.00	0.00	100.00

Figure 99. Area level data on SDCCH and TCH availability in report 200, Performance statistics (benchmark).

11.2.2 Availability of time slots on BTS hit list

For the availability of time slots on a BTS hit list, run the report **Cells having unavailable radio time slots** (139).

==

Cells having unavailable TSL
between 20010115 and 20010115

BSC (BTS id)	BCF Name BTS Name	SDCCH ***** unava avail%	TCH ***** unava avail%	HTCH FTCH PS ter	Dyn SDCCH ***** att	Ave Non Avail TSL	Hours
BSC MERKURIUS (9)	KPNMETRO MetroSite	8.0 0.0	14.0 0.0	0.0 0.0 0.0	0	15.0	24
BSC MERKURIUS (5)	BCF6 LAB6	4.0 0.0	15.0 0.0	0.0 0.0	0	16.0	24

```
                                                       0.0

BSC MERKURIUS   TEKRECP            11.0   14.0    0.0      0    16.0    24
(10)            TEKRECP             0.0    0.0    0.0
                                                  0.0

BSC MERKURIUS   LABRA1A            11.0   30.0    0.0      0    32.0    24
(1)             LAB1                0.0    0.0    0.0
                                                  0.0
```

Figure 100. Report 139: Cells having unavailable radio time slots

11.2.3 Availability of SDCCH and TCH on BTS level

To find about the availability of SDCCH and TCH on the BTS level, run the report **Cell analyser** (216).

```
.                                                    Whole        TCH
.                                                    period       Busy hour
.                                                    =======      =========
TCH (speech and GPRS)
===

Extended TRXs
Available TCH (CS)........................../ava_29    0.00          0.00
Unavailable TCH (CS)......................./uav_14    0.00          0.00
. TCH AVAILABILITY ......................../ava_1d      na %          na %

Normal TRXs
Available TCH (CS)........................../ava_28    4.00          4.00
Available PDTCH (PS)......................./ava_16a    3.00          3.00
Unavailable TCH .........................../uav_13    0.00          0.00
. TCH AVAILABILITY ......................../ava_1d  100.00 %      100.00 %


.                                                    Whole        SDCCH
.                                                    period       Busy hour
.                                                    =======      =========
SDCCH
=====

Extended TRXs
Available SDCCH ............................/ava_3      na            na
Unavailable SDCCH ........................./uav_10      na            na
. SDCCH AVAILABILITY ......................./ava_4      na %          na %

Normal TRXs
Available SDCCH ............................/ava_3    3.00          3.00
Unavailable SDCCH ........................./uav_10    0.00          0.00
. SDCCH AVAILABILITY ......................./ava_4  100.00 %      100.00 %
```

Figure 101. BTS level data on SDCCH and TCH availability in report 216, Cell analyser.

11.3 BSC units

The **Availability per BSC unit** (215) report shows for each unit of each BSC the total disconnection time and the total number of restarts over the given time period.

```
================================================================================

              Unit availability for BSCs from 19991117 to 19991117

Object:      BSC1KUTOJA-50264

Unit name  Dconn time         Dconn time dup     Unit restarts  Unit restarts dup
---------- ----------------- ----------------- -------------- -----------------
BCSU-0         0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
BCSU-1         0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
BCSU-2         0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
BCSU-3         0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
BCSU-4         0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
CLAB-0         0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
CLAB-1         0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
CLS-0          0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
CLS-1          0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
ET-32          0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
ET-33          0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
ET-34          0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
ET-35          0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
ET-36          0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
ET-37          0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
ET-38          0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
ET-39          0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
ET-40          0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
ET-41          0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
ET-42          0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
ET-43          0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
ET-44          0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
ET-45          0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
ET-46          0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
ET-47          0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
ET-48          0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
ET-49          0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
ET-56          0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
ET-57          0 hr 15 m  0 s     0 hr  0 m  0 s              0                 0
MB-0           0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
MB-1           0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
MCMU-0         0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
MCMU-1         0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
OMU-0          0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
SBUS-0         0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
SBUS-1         0 hr  0 m  0 s     0 hr  0 m  0 s              0                 0
```

Figure 102. Report 215: Availability per BSC unit

12 Interference

12.1 Uplink interference

The uplink interference is reported by the BSCs as counters showing the average number of time slots in bands 1 to 5. Usually band 1 is defined (boundaries are defined in cell parameters) so that the time slots located outside it can be said to have interference.

12.1.1 Uplink interference on area level

For boundary settings and daily averages for each band, use the report **Performance statistics (benchmark)** (200).

```
===============================================================================
                 UPLINK INTERFERENCE STATISTICS
===============================================================================

The UL interference is measured based on the levels in idle FTCH.
The measurement reports the average number of idle FTCHs in different
bands which are defined by boundaries. Boundaries are set as BTS
parameters.

------------------ boundary B00 (value fixed: -110dBm)
band 1
------------------ boundary B01 (value eg.:   -105dBm, critical)
band 2
------------------ boundary B02 (value e.g.:  -100dBm)
band 3
------------------ boundary B03 (value e.g.:  -95dBm)
band 4
------------------ boundary B04 (value e.g.: -90dBm)
band 5
------------------ boundary B05 (value fixed: -47dBm)

The boundaries used in the selected BTS area are reported below:


THRS BOUNDARY1 (BO0) - fixed             BTS COUNT
---------------------------------------- ---------
-110.0 dBm                                     177

THRS BOUNDARY1 (BO1)                     BTS COUNT
---------------------------------------- ---------
-105.0 dBm                                     176
 -95.0 dBm                                       1
```

```
THRS BOUNDARY2 (BO2)                         BTS COUNT
----------------------------------------- ---------
-100.0 dBm                                      176
 -83.0 dBm                                        1

THRS BOUNDARY3 (BO3)                         BTS COUNT
----------------------------------------- ---------
 -95.0 dBm                                      176
 -71.0 dBm                                        1

THRS BOUNDARY4 (BO4)                         BTS COUNT
----------------------------------------- ---------
 -90.0 dBm                                      176
 -59.0 dBm                                        1

THRS BOUNDARY5 (BO5) - fixed                 BTS COUNT
----------------------------------------- ---------
 -47.0 dBm                                      177

The distribution of idle FTCH in the selected area:


         idle FTCH idle FTCH idle FTCH idle FTCH idle FTCH
         in band 1 in band 2 in band 3 in band 4 in band 5
Day MMDD       (%)       (%)       (%)       (%)       (%)
--- ---- --------- --------- --------- --------- ---------
tue 1121      98.5       0.0       0.9       0.0       0.5
mon 1120      98.5       0.1       0.9       0.0       0.5
sun 1119      98.5       0.0       0.9       0.0       0.5

Note: For a cell level list, run report 190.
```

Figure 103. Area level data on uplink interference in report 200, Performance statistics (benchmark).

12.1.2 Uplink interference on BTS hit list

The report **Cells having UL interference, 24-hour/10-day breakdowns** (190) lists the cells having uplink interference and shows the BTS breakdown table for the time-out of band 1 per cell and the hour for cells having hours with interference.

For this report it is important that you define the boundary for band 1 correctly. You can see the boundaries in the breakdown matrices produced for each cell. The report works especially well when there are not yet many TRXs in the BTSs.

```
===============================================================================
=
=                    CELLS HAVING INTERFERENCE,
=                    24-HOUR/10-DAY BREAKDOWNS
=
=                    Network:            PLMN
=                    Area:               BSC - BSC1KUTOJA
=                    Period:             averaged from 19991117 to 19991117
=                                        breakdown for 10 last days
=                    Interference limit:          0 %
=
===============================================================================

FIRST REPORT
The first report shows the cells with interference, averaged across BTS,
```

```
and hour for the period given.

The last column shows the time in percentage that cell has been out of
band 1 (class 0). For example, 3 % or more on the timeout of band 1 is considered
interference. Instead of using the default 3 %, the users can define their own limi
t.
Note that boundary 1 setting will effects the result.

FTCH 'n' indicates the average number of idle full TCH in band 'n' (1-5).
If there is no interference (uplink), all idle TCHs should be in band 1.
The bands are defined in cell parameters by setting the boundaries in
interference averaging parameter set.

------------------ boundary 0 (value fixed: -110dBm)
band 1 (FTCH 1)
------------------ boundary 1 (value eg.:   -105dBm, critical for the report)
band 2 (FTCH 2)
------------------ boundary 2 (value e.g.:  -100dBm)
band 3 (FTCH 3)
------------------ boundary 3 (value e.g.:  -95dBm)
band 4 (FTCH 4)
------------------ boundary 4 (value e.g.: -90dBm)
band 5 (FTCH 5)
------------------ boundary 5 (value fixed: -47dBm)

SECOND REPORT
The second report shows the breakdown of interference, over 24 hours of
each of the last ten days. The values per hour mean the percentage of
time slots out of band 1. The higher the value, the worse the interference.
A blank value stands for missing PM data; it does not mean that there
is not any interference.

Used counter formula: itf_1

Measurement used: p_nbsc_res_avail

Instructions:
- Check the 10-day/24-hour breakdown charts to find out what the pattern is.
- If you suspect that the interference is from the BS itself (constant
100% interference e.g. in all sectors) you may set
the power to minimum for a while (this means that calls cannot be made!)
and check from the BSC MML with ZERO command if the interference level has
gone down in idle time slots. Then put the power back to the initial level.
- After you have found the cells with obvious UL interference
you may use  Undefined Adj. Cell measurement (possibly with the idle state BA
list to define what are the strongest frequencies in the band which are not
adjacent cells.
- It is also a good idea to check if the cell is not reported by report 062,
which could mean interference from own adjacent cell.
- You may also run the report 216 to get more details about the cell.
- For TRX level interference break down  you can use report 196
hourly matrix) or 206 (meas.period level profile).

Note:
.     If Mast Head Amplifiers are used, the boundary settings need to be checked.
.     MHA for the 1800 and 1900 networks add a constant 12 dB gain, whereas
.     TalkFamily MHA for the 900 network has an adjustable gain.
.     Additionally, TalkFamily MHAs have a 12 dB nominal gain and UltraSites
.     have a high, 32...33 dB gain.

Note: Since T10/S6 Power Control measurement contains TRX level counter
.     for average interference band. Use report 196 to see interference on
.     TRX level.

Note: Running this report is heavy and takes time. Patience please.

================================================================================
```

Cells having UL interference
averaged from 19991117 to 19991117

BSC Name (BTS ID)	BCF Name BTS Name	PERIOD START TIME (hh)	AVE IDLE FTCH BAND 1	AVE IDLE FTCH BAND 2	AVE IDLE FTCH BAND 3	AVE IDLE FTCH BAND 4	AVE IDLE FTCH BAND 5	TIME OUT BAND 1 (%)
BSC1KUTOJA 11	KILO007 KILO1011	10	13.9	0.0	0.0	0.0	0.0	0
BSC1KUTOJA 18	SANDPG009 SANDPG1018	08	6.0	0.0	0.0	0.0	0.0	0
		10	5.9	0.0	0.0	0.0	0.0	0
		11	5.9	0.0	0.0	0.0	0.0	1

.

UL interference, 24-hour/10-day breakdown
BSC1KUTOJA:KILO007:KILO1011
boundaries: -110,-105,-100,-95,-90,-47 (dBm)

Hr	sun 07 NOV	mon 08 NOV	tue 09 NOV	wed 10 NOV	thu 11 NOV	fri 12 NOV	sat 13 NOV	sun 14 NOV	mon 15 NOV	tue 16 NOV	wed 17 NOV
06	0	0	0	0	0	0	0	0	0	0	0
07	0	0	0	0	0	0	0	0	0	0	0
08	0	0	0	0	0	0	0	0	0	0	0
09	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	
13	0	0	0	0	0	0	0	0	0	0	
14	0	0	0	0	0	0	0	0	0	0	
15	0	0	0	0	0	0	0	0	0	0	
16	0	0	0	0	0	0	0	0	0	0	
17	0	0	0	0	0	0	0	0	0	0	
18	0	0	0	0	0	0	0	0	0	0	
19	0	0	0	0	0	0	0	0	0	0	
20	0	0	0	0	0	0	0	0	0	0	
21	0	0	0	0	0	0	0	0	0	0	

UL interference, 24-hour/10-day breakdown
BSC1KUTOJA:SANDPG009:SANDPG1018
boundaries: -110,-105,-100,-95,-90,-47 (dBm)

Hr	sun 07 NOV	mon 08 NOV	tue 09 NOV	wed 10 NOV	thu 11 NOV	fri 12 NOV	sat 13 NOV	sun 14 NOV	mon 15 NOV	tue 16 NOV	wed 17 NOV
06	0	0	0	0	0	0	0	0	0	0	0
07	0	0	0	0	0	0	0	0	0	0	0
08	0	0	0	0	0	1	0	0	0	0	0
09	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	1	0	1	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	1
12	0	0	0	0	0	0	0	0	0	0	
13	0	0	0	0	0	0	0	0	0	0	
14	0	0	0	0	0	0	0	0	0	0	
15	0	0	0	0	0	0	0	0	0	0	
16	0	0	0	0	0	1	0	0	0	0	
17	0	0	0	0	0	0	0	0	0	0	
18	0	0	0	0	0	0	0	0	0	0	

```
19     0     0     0     0     0     0     0     0     0     0
20     0     0     0     0     0     0     0     0     0     0
21     0     0     0     0     0     0     0     0     0     0
```

Figure 104. Report 190: Cells having UL interference, 24-hour/10-day breakdowns

In this example the report shows two cells with interference. One of them has not suffered from any interference until during the last few days, whereas the other one has suffered from it all the time.

There are some gaps in the matrices which indicate missing data. This means that the data transfer from a BSC to the Nokia NetAct database has not been 100 per cent reliable or that measurements are not set to run every hour.

12.1.3 UL interference on BTS level

For averages, boundaries and hourly breakdown, run the report **Cell analyser** (216).

```
===============================================================================
=                          Cell UL interference
=                BSC1KUTOJA      bts id:20  name:SANDPD1020
=                 from 19990917 to 19990920
===============================================================================

.                                                       Whole        TCH
.                                                       period       busy hour
.                                                       average      average
.                                                       =======      =========

UL interference (time out band 1) ........../itf_1      0.01 %         0.00 %

.    time in band 1 ( -110dBm <= B1 <=  -105dBm )      99.99 %       100.00 %
.    time in band 2 ( -105dBm <  B2 <=  -100dBm )       0.00 %         0.00 %
.    time in band 3 ( -100dBm <  B3 <=   -95dBm )       0.00 %         0.00 %
.    time in band 4 (  -95dBm <  B4 <=   -90dBm )       0.01 %         0.00 %
.    time in band 5 (  -90dBm <  B5 <=   -47dBm )       0.00 %         0.00 %

TRX level interference (from Power Control measurment)
======================

          Avg
          Intf
TRX   TRX band
 id  freq (itf_4)
--- ----- -------
  3   303   1.0
  4   570   1.0
-
************************************************************************
Average band of TCH interference (itf_4)
BSC1KUTOJA      BCF:SANDPD010      BTS:20 SANDPD1020      trx:3
************************************************************************

-1 = divisor is 0
Note: TRX level. Works only if traffic on TCH
Reported as band number 0...5, 1 means lowest. Band boundaries are
defined in cell parameters (Interference Averaging parameters).
```

```
Boundary0 =  -110dBm  dBm (Nokia default -110  dBm)
Boundary1 =  -105dBm  dBm (Nokia default -105  dBm)
Boundary2 =  -100dBm  dBm (Nokia default -100  dBm)
Boundary3 =   -95dBm  dBm (Nokia default  -95  dBm)
Boundary4 =   -90dBm  dBm (Nokia default  -90  dBm)
Boundary5 =   -47dBm  dBm (Nokia default  -47  dBm)

Hints: For BTS level hit list run the report 196.

     fri   sat   sun   mon   tue   wed   thu   fri   sat   sun   mon
      10    11    12    13    14    15    16    17    18    19    20
Hr   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP   SEP
-- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
00     1                 1     1
08                                   2     1     1     1     1     1
10                             1     1     1     1     1     1     1
12                             1     1     1     1     1     1     1
14                             1     1     1     1     1     1     1
16                             1     1     1     1     1     1     1
18                             1     1     1     1     1     1     1
```

Figure 105. BTS level data on UL interference in report 216, Cell analyser.

12.2 Interference from the same or adjacent frequencies

In urban areas the tight frequency reuse and difficulty to estimate the propagation of the radio waves may cause unexpected interference of the same or adjacent frequencies.

To check a cell for possible interference, use the Undefined Adjacent Cell measurement together with or without the Double BA List feature.

If the Double BA List feature is available as an option in the BSC, it is possible to monitor the frequencies which are not adjacent cell frequencies. Proceed as follows:

1. Create a BAL with the suspected frequencies and assign them to the cell.

2. Activate the Undefined Adjacent Cell measurement in the BSC.

The BSC will now report all detected frequencies which were on the BAL and which are not the frequencies of the defined adjacent cells.

If the Double BA List feature is not available, the Undefined Adjacent Cell measurements give frequencies which are the same as in the neighbouring list only that their BSIC differs from that of the adjacent cell definition. Thus, you can find out the interfering frequencies only if they are the same as in the neighbouring list.

To see the results, run the report:

- **Defined, undefined and used adjacencies of a cell** (072) which also shows for the selected BTS the frequencies reported by the Undefined Adjacent Cell measurement.
- **Undefined adjacent cells** (073) for the frequencies detected as undefined for all cells. Note that this report may be heavy to run.
- **Cells having undefined adjacent measurement results** (125) to find out which cells have records in the Undefined Adjacent Cell measurement table.

13 Intelligent underlay-overlay

BSS Network Doctor provides two reports for monitoring intelligent underlay-overlay (IUO) occurrences on area and BTS level.

13.1 Intelligent underlay-overlay on area level

For averages on the area level, run the report **Cells by average traffic absorption to super TRXs** (401).

```
===============================================================================
=
=                   IUO
=                   CELLS BY AVERAGE TRAFFIC ABSORPTION TO SUPER TRXs
=
=                   Network:            PLMN
=                   Area:               BSC - BSC1KUTOJA
=                   Period:             from 19991117 to 19991117
=                   Sorted by:          Traffic absorption to super TRXs
=
===============================================================================

Measurement used: p_nbsc_underlay

Running this report takes a while. Patience please.

===============================================================================

            IUO: Cells by Traffic Absorbtion to Super TRXs. Average.
                          between 19991117 and 19991117
                   sorted by Traffic absorption to super TRXs

                                  Traffic  Traffic Absorbtion on    Usage of
                                 on super   on all     super TRXs super TRXs
BSC           BTS NAME               TRXs     TRXs            (%)        (%)
(BTS id)      BCF NAME           /trf_9a /trf_10a          /trf_8    /trf_29
------------- ----------------- -------- -------- -------------- ----------
BSC1KUTOJA    KUTOJA1002            1.48     1.50          98.65      15.67
(2)           KUTOJA001

BSC1KUTOJA                          0.01     0.01          93.33       0.08
(6)           SUOSAA004
```

Figure 106. Report 401: Cells by average traffic absorption to super TRXs

For busy hour traffic on the area level, run the report **Cells by busy hour traffic absorption to super TRXs** (402).

```
==============================================================================
=
=                   IUO
=                   CELLS BY BUSY HOUR TRAFFIC ABSORPTION TO SUPER TRXs
=
=                   Network:            PLMN
=                   Area:               BSC - BSC5
=                   Period:             from 19981122 to 19981122
=                   Sorted by:          Traffic absorption to super TRXs
=
==============================================================================

The absolute busy hour by traffic is defined for each cell and for this
hour the absorption of the traffic to super TRXs is calculated.

Columns:
Traffic on all TRX       trf_10a    Sum of traffic of all TRXs (Erl)
Traffic on super TRX     trf_9a     Sum of traffic of super TRXs (Erl)
Absorb. on super TRX     trf_8      Absorbtion % of traffic to super TRXs
Usage of super TRX       trf_29     Usage % super TRXs

Measurement used: p_nbsc_underlay

Note: Running this report takes some minutes. Patience please.

==============================================================================
           IUO: Cells by Traffic Absorption to Super TRXs. Busy Hour.
                          between 19981122 and 19981122
                   sorted by Traffic absorption to super TRXs

                                Peak   Traffic  Traffic
                                hour    on all on super Absorb. on  Usage of
BSC           BTS NAME          YYYY       TRX      TRX  super TRX super TRX
(BTS id)      BCF NAME          MMDDHH   (Erl)    (Erl)        (%)       (%)
------------- ----------------- ------ ------- -------- ---------- ---------
BSC5          Sector A            1998    2.14     1.61      74.87     10.03
(18)          Site X            112210

BSC5          Sector B            1998    5.69     4.18      73.54     26.15
(10)          Site Y            112218

BSC5          Sector C            1998    8.07     5.84      72.39     36.52
(8)           Site Z            112215
```

Figure 107. Report 402: Cells by busy hour traffic absorption to super TRXs

13.2 Intelligent underlay-overlay on BTS level

For IUO counters on the BTS level, run the report **IUO counters of a cell** (400).

```
==============================================================================
=
=                   IUO COUNTERS OF A CELL
=
=                   Network:            PLMN
=                   BSC:                BSC12
=                   BCF:                (19)   XXXXXXXXXXXXX
```

```
=                  BTS:                (19)   XXXXXXXXXXXXX1
=                  Period:             from 19971119 to 19971119
=
================================================================================

This report shows counter information about IUO for one cell.

Measurement used: p_nbsc_traffic, p_nbsc_underlay, p_nbsc_rx_qual,
                  p_nbsc_ho, p_nbsc_res_avail

================================================================================


Measurement hours
.             underlay table:          4

Busy Hour in the given period is the hour ending on  1997111910
There are          3 trxs reported in the underlay measurement.
-
================================================================================
=                     IUO Configuration. BTS
=                BSC12           bts id:19  name:XXXXXXXXXXXXX1
================================================================================


HOC

Super reuse estimation method          (METH): Not used
Interfering cell averaging window size (SIZE): 10
Interfering cell number of zero result (ZERO): 2
All interfering cells averaged         (AVER): No
Super reuse good C/I threshold          (GCI): 17 dB
      threshold px                      (GPX): 8
      threshold nx                      (GNX): 10
Super reuse bad  C/I threshold          (BCI): 10 dB
      threshold px                      (BPX): 2
      threshold nx                      (BNX): 6
Minimum bsic decode time                (TIM): 10 SACCH periods
Enable TCH assignment super IUO         (ETA): 0 SACCH periods
Min interval between IUO HO req         (MIR): 10
Min interval between unsucc IUO HO      (MIO): 20


-
================================================================================
=                     IUO Configuration. TRX
=                BSC12           bts id:19  name:XXXXXXXXXXXXX1
================================================================================


BSC:  OMC Name:             Description:
----  ---------             ----------
FRT   Frequency Type        Type of the radio frequency of the tranceiver.
LAC   LAC                   Location Area Code of the interfering cell.
CI    CI                    Cell Identification of the interfering cell.
L     Level Adjustment      Level adjustment of the interfering cell.
W     C/I Weight            C/I Weight of the interfering cell.
T     C/I Type              C/I Type of the interfering cell.


TRX : 1

     FRT  : regular

     LAC1 :     0     CI1 :     0     L1 :     0     W1 :     0     T1 :     0
     LAC2 :     0     CI2 :     0     L2 :     0     W2 :     0     T2 :     0
     LAC3 :     0     CI3 :     0     L3 :     0     W3 :     0     T3 :     0
```

```
     LAC4 :     0     CI4 :     0     L4 :     0     W4 :     0     T4 :     0
     LAC5 :     0     CI5 :     0     L5 :     0     W5 :     0     T5 :     0
     LAC6 :     0     CI6 :     0     L6 :     0     W6 :     0     T6 :     0

TRX : 5

     FRT  : super reused =   1

     LAC1 :  4250     CI1 :  1046     L1 :     0     W1 :     1     T1 :     0
     LAC2 :  4270     CI2 :  1130     L2 :     0     W2 :     1     T2 :     0
     LAC3 :  4270     CI3 :  1058     L3 :     0     W3 :     1     T3 :     0
     LAC4 :  4250     CI4 :  1184     L4 :     0     W4 :     1     T4 :     0
     LAC5 :  4270     CI5 :  1385     L5 :   -18     W5 :     1     T5 :     0
     LAC6 :  4270     CI6 :  1062     L6 :   -18     W6 :     1     T6 :     0

TRX : 7

     FRT  : regular

     LAC1 :     0     CI1 :     0     L1 :     0     W1 :     0     T1 :     0
     LAC2 :     0     CI2 :     0     L2 :     0     W2 :     0     T2 :     0
     LAC3 :     0     CI3 :     0     L3 :     0     W3 :     0     T3 :     0
     LAC4 :     0     CI4 :     0     L4 :     0     W4 :     0     T4 :     0
     LAC5 :     0     CI5 :     0     L5 :     0     W5 :     0     T5 :     0
     LAC6 :     0     CI6 :     0     L6 :     0     W6 :     0     T6 :     0

-
================================================================================
=                  IUO performance. Regular and Super layers.
=                  BSC12           bts id:19  name:XXXXXXXXXXXXX1
=                   from 19971119 to 19971119
================================================================================


Cell layer statistics:

.                                             Average     Busy hour
.                                             =======     =========
Cell traffic .........................(erl)      6.31          7.16   /trf_9
Super TRX traffic ....................(erl)      3.29          3.61   /trf_10
Traffic absorption on super ...........(%)     52.10         50.43   /trf_8
.
TCH seizure length on regular.........(sec)     7.45          7.72   /trf_15b
TCH seizure length on super...........(sec)    21.04         21.14   /trf_14b
.
TCH raw blocking on regular ............(%)     0.00          0.00   /blck_7
TCH raw blocking on super ..............(%)     7.48         10.09   /blck_6
.

HO att from regular to super.  Total:  2340                     --   /ho_2
HO fail from regular to super ..........(%)     1.67            --   /hfr_13
.                         return............   74.36 %          --   /hfr_14
.                         MS lost...........    5.13 %          --   /hfr_15
.                         other.............   20.51 %          --   /hfr_16


HO att from super to regular.  Total:   863                          /ho_3
HO fail from super to regular ..........(%)     2.32            --   /hfr_12
.                         return............   75.00 %          --   /hfr_17
.                         MS lost...........   15.00 %          --   /hfr_18
.                         other.............   10.00 %          --   /hfr_19

Return from super to regular ...........(%)    39.65         40.83   /ho_1
.                         DL quality........   25.81 %       19.28 % /ho_4
.                         DL interference...   56.98 %       64.66 % /ho_5
.                         UL interference...   11.40 %       10.44 % /ho_6
.                         bad C/I...........    5.81 %        5.62 % /ho_7
```

```
-
===============================================================================
=                        IUO performance. TRXs.
=                  BSC12           bts id:19  name:XXXXXXXXXXXXX1
=                   from 19971119 to 19971119
===============================================================================

Average TRX statistics:


                             Ave
                             TCH
                     Ave    seiz      UL       UL       DL      TCH
                    traf  length interf   Qual5    Qual5     drop
TRX  TRX Cell      (Erl)   (sec)     (%)      (%)      (%)      (%)
 id Freq Layer   /trf_16 /trf_17 /itf_3  /ulq_2  /dlq_2 /dcr_14
--- ---- ------- ------- ------- ------ ------- ------- -------
  1   49 regular     2.5     7.3   17.1   89.44   87.31    0.17
  7   71 regular     0.6     7.9   12.0   93.55   82.23    0.17
  5   78 super       3.3    21.0   26.1   98.53   98.45    0.22


Busy Hour TRX statistics (BH = 1997111910 ):


                             Ave
                             TCH
                     Ave    seiz      UL       UL       DL      TCH
                    traf  length interf   Qual5    Qual5      drop
TRX  TRX Cell      (Erl)   (sec)     (%)      (%)      (%)       (%)
 id Freq Layer   /trf_16 /trf_17 /itf_3  /ulq_2  /dlq_2  /dcr_14
--- ---- ------- ------- ------- ------ ------- -------  -------
  1   49 regular     2.9     7.8   18.1   89.78   88.69     0.48
  7   71 regular     0.7     7.2   13.7   92.73   85.45     0.49
  5   78 super       3.6    21.1   27.0   98.29   98.50     0.21
-
===============================================================================
=                            Traffic / Underlay Overlay
=                  BSC12           bts id:19  name:XXXXXXXXXXXXX1
=                   from 19971119 to 19971119
===============================================================================

TCH req UO    1090       TCH requests for underlay-overlay procedure.
TCH seiz UO   1091       TCH seizures for underlay-overlay procedure.
TCH rej UO    1092       TCH seizures for underlay-overlay procedure rejected
.                        due to lack of resources. This is between the regular
.                        and super layers to both directions.

        TCH   TCH   TCH
        req  seiz   rej
DD HH    UO    UO    UO
-- -- ----- ----- -----
19 09   575   575     0
   10   932   863    69
   16   988   909    79
   17   791   757    34

-
===============================================================================
=                            Handover / Underlay Overlay
=                  BSC12           bts id:19  name:XXXXXXXXXXXXX1
=                   from 19971119 to 19971119
===============================================================================
```

```
Cause bad CI   4089  HO attempts due to bad C/I ratio on super reuse freq.
Cause good CI  4090  HO attempts due to good C/I ratio on super reuse freq.

          HO      HO
       cause   cause
DD HH bad CI good CI
-- -- ------ -------
19 09     11     399
   10     14     663
   16     19     714
   17      8     559

-
===============================================================================
=                          Underlay Overlay (part 1)
=                 BSC12           bts id:19  name:XXXXXXXXXXXXX1
=                  from 19971119 to 19971119
===============================================================================

TCH req    52003       Number of TCH requests (call or HO on regular cell,
.                      HO in super-reuse)
TCH seiz   52004       Number of successful TCH seizures
TCH rej    52005       TCH seizures rejected due to lack of resources
TCH traf   52028/52029 Average nbr of busy TCH (=traffic)
TCH fail   52006       TCH failures during call or HO
TCH rf     52007       TCH failures due to radio failures

HO inhib. itf. too high
.          52040       Number of times when HO to super-reuse candidate is
.                      inhibited because the estimated C/I ratio is too low.
.                      The sampling period is 0,48s.
HO inhib. qual. too low
.          52041       Number of times when HO to super-reuse candidate is
.                      inhibited because of bad quality experience on
.                      super-reuse frequency. The sampling period is 0,48s.

FTCH  itf b1-b5
.  Counters 52008/52009,52010/52011,52012/52013,52014/52015,52016/52017.
.  Average nbr of idle FTCH in interference band 1 to band 5 (uplink)
.  Note that when there are no measurement results BSC records the time
.  to band 5 to be on the safe side.

Cell id c1-c10
.  Counters 52030,52032,52034,52036,52038,52064,52066,52068,52070,52072.
.  Cell id of interfering cell 1 to 5

Lac c1-c10
.  Counters 52030,52032,52034,52036,52038,52064,52066,52068,52070,52072.
.  Cell LAC of interfering cell 1 to 5

HO inhib. itf high c1-c10
.  Counters 52031,52033,52035,52037,52039,52065,52067,52069,52071,52073.
.  Number of times when HO to super-reuse candidate is inhibited
.  because the directly measured C/I ratio is too low
.  and the source of interference is cell cX. The sampling period is 0,48 s.

          TCH    TCH                                 HO
          *****  ***** HO    HO                      inhib.
          req    fail  inhib inhib FTCH              itf
          seiz   rf    itf.  qual. itf    Cell i    Lac high
          rej          too   too   ****** ****** ****** *****
TRX DD HH traf         high  low    b1-b5 c1-c10 c1-c10 c1-c10
--- -- -- ------ ----- ----- ----- ------ ------ ------ ------
  1 19 09    949    10     0     0    3.6      0      0     0
             938     6                0.5      0      0     0
               0                      0.1      0      0     0
             1.8                      0.0      0      0     0
                                      0.0      0      0     0
```

```
                                                             0        0      0
                                                             0        0      0
                                                             0        0      0
                                                             0        0      0
                                                             0        0      0

         10  1347    11      0      0    2.6      0        0      0
             1315     3                  0.5      0        0      0
                0                        0.1      0        0      0
              2.9                        0.0      0        0      0
                                         0.0      0        0      0
                                                  0        0      0
                                                  0        0      0
                                                  0        0      0
                                                  0        0      0
                                                  0        0      0

         16  1419    10      0      0    2.6      0        0      0
             1399    12                  0.5      0        0      0
                0                        0.1      0        0      0
              2.8                        0.0      0        0      0
                                         0.0      0        0      0
                                                  0        0      0
                                                  0        0      0
                                                  0        0      0
                                                  0        0      0
                                                  0        0      0

         17  1176    15      0      0    3.0      0        0      0
             1162     8                  0.6      0        0      0
                0                        0.2      0        0      0
              2.3                        0.0      0        0      0
                                         0.0      0        0      0
                                                  0        0      0
                                                  0        0      0
                                                  0        0      0
                                                  0        0      0
                                                  0        0      0

  5 19 09     420     0      0    841    4.6   1046     4250   2231
              420     0                  0.4   1130     4270    513
                0                        0.1   1058     4270    358
           TCH    TCH                                        HO
           *****  ***** HO    HO                             inhib.
           req    fail  inhib inhib FTCH                     itf
           seiz   rf    itf.  qual. itf    Cell i     Lac high
           rej          too   too   ****** ****** ****** *****
TRX DD HH traf          high  low    b1-b5 c1-c10 c1-c10 c1-c10
--- -- -- ------ ----- ----- ----- ------ ------ ------ ------
              2.3                        0.0   1184     4250    580
                                         0.6   1385     4270    100
                                               1062     4270      0
                                                  0        0      0
                                                  0        0      0
                                                  0        0      0
                                                  0        0      0

  5 19 10     684     1      0   1212    3.2   1046     4250   2593
              615     1                  0.3   1130     4270    641
               69                        0.1   1058     4270    479
              3.6                        0.0   1184     4250   1018
                                         0.7   1385     4270     58
                                               1062     4270      0
                                                  0        0      0
                                                  0        0      0
                                                  0        0      0
                                                  0        0      0
```

```
         16    738      1       0  1226     3.0     1046    4250  1915
               659      0                   0.4     1130    4270   789
                79                          0.1     1058    4270   646
               3.7                          0.0     1184    4250  1237
                                            0.8     1385    4270    78
                                                    1062    4270     0
                                                       0       0     0
                                                       0       0     0
                                                       0       0     0
                                                       0       0     0

         17    590      1       0   713     3.1     1046    4250  2450
               556      2                   0.3     1130    4270   578
                34                          0.1     1058    4270   345
               3.6                          0.0     1184    4250   735
                                            0.8     1385    4270    56
                                                    1062    4270     0
                                                       0       0     0
                                                       0       0     0
                                                       0       0     0
                                                       0       0     0

    7 19 09    175      0       0     0     7.0        0       0     0
               186      0                   0.5        0       0     0
                 0                          0.1        0       0     0
               0.4                          0.0        0       0     0
                                            0.0        0       0     0
                                                       0       0     0
           TCH    TCH                                            HO
           *****  ***** HO     HO                                inhib.
           req    fail  inhib  inhib  FTCH                       itf
           seiz   rf    itf.   qual.  itf    Cell i      Lac     high
           rej          too    too    ****** ****** ******       *****
TRX DD HH  traf         high   low     b1-b5 c1-c10 c1-c10       c1-c10
--- -- -- ------ ----- ----- ----- ------ ------ ------ ------
                                                       0       0     0
                                                       0       0     0
                                                       0       0     0
                                                       0       0     0

    7 19 10    308      5       0     0     6.3        0       0     0
               340      1                   0.8        0       0     0
                 0                          0.1        0       0     0
               0.7                          0.0        0       0     0
                                            0.0        0       0     0
                                                       0       0     0
                                                       0       0     0
                                                       0       0     0
                                                       0       0     0
                                                       0       0     0

         16    243      3       0     0     6.5        0       0     0
               263      1                   0.7        0       0     0
                 0                          0.2        0       0     0
               0.5                          0.0        0       0     0
                                            0.0        0       0     0
                                                       0       0     0
                                                       0       0     0
                                                       0       0     0
                                                       0       0     0
                                                       0       0     0

         17    227      1       0     0     6.3        0       0     0
               241      1                   0.8        0       0     0
                 0                          0.2        0       0     0
               0.6                          0.1        0       0     0
                                            0.0        0       0     0
                                                       0       0     0
```

```
                                                 0      0      0
                                                 0      0      0
                                                 0      0      0
                                                 0      0      0

-
===============================================================================
=                           Underlay Overlay (part 2).
=                           HO counters for super TRXs.
=                 BSC12           bts id:19  name:XXXXXXXXXXXXX1
=                  from 19971119 to 19971119
===============================================================================

NOTE: Counters are shown only for super TRXs.

HO R->S             Handovers from reqular frequency to super
**************
.     att    52048       HO attempts.
.     suc    52049       Successfull HO attempts.
.     rej    52050       Rejected HO attempts due to lack of resources.


HO fail R->S        Failures in handovers from reqular frequency to super
*******************
.  return    52052       Returns to old channel.
. MS lost    52053       MS is lost.
.   other    52051       Other failures.

HO S->R             Handovers from super to reqular frequencies
************
.     att    52042       HO attempts.
.     suc    52043       Successfull HO attempts.
.     rej    52044       Rejected HO attempts due to lack of resources.

HO fail S->R        Failures in handovers from super to reqular frequencies
*****************
.  return    52046       Returns to old channel.
. MS lost    52047       MS is lost.
.   other    52045       Other failures.


HO att S->R         Handover attempts from this super-reuse TRX.
**********************
. DL Qual    52060       Due to downlink quality
.  DL itf    52061       Due to downlink interference
.  UL itf    52062       Due to downlink interference
.  bad CI    52063       Due to bad C/I ratio

HO in super f.gr.   Handovers in super-reuse frequency group
*****************
.     att    52054       HO attempts.
.     suc    52055       Successfull HO attempts.
.     rej    52056       Rejected HO attempts due to lack of resources.


HO fail in super f.gr. Failures in handovers in super-reuse frequency group
**********************
.  return    52058       Returns to old channel.
. MS lost    52059       MS is lost.
.   other    52057       Other failures.


                                                HO    HO fail
                                                in    in
          HO      HO fail HO     HO fail HO att super super
          R->S    R->S    S->R   S->R    S->R   f.gr. f.gr.
          *****   *****   *****  *****   *****  ***** *****
```

```
          att      return  att     return  DL Qual att   return
          succ     MS lost succ    MS lost DL itf  succ  MS lost
          rej      other   rej     other   UL itf  rej   other
TRX DD HH                                  bad CI
--- -- -- ------- ------- ------ ------- ------- ----- -------
  5 19 09     405       0    166       2      31    15       0
              401       4    163       0     118    15       0
                0       0      0       1      16     0       0
                                              11

       10     660       2    243       5      48    23       0
              578       7    236       2     161    21       0
               67       6      0       0      26     2       0
                                              14

       16     718       0    259       4      85    19       0
              634       6    253       1     137    17       0
               77       1      0       1      22     2       0
                                              19

       17     557       0    195       4      67    34       0
              513      12    191       0      94    31       0
               31       1      0       0      38     3       0
                                               8
```

Figure 108. Report 400: IUO counters of a cell

For each cell of the selected BTS area, the **KPI statistics for IUO cells** (403) report shows the following key performance indicators:

- Total traffic of all and super TRXs
- Absorption of traffic to super TRXs
- TCH drop ratio
- Handover failure ratio
- TCH raw blocking
- Average TCH seizure length on regular and super TRX
- TCH blocking on regular and super TRX
- Ratio of downlink quality caused returns to all returns from super TRX
- Ratio of downlink returns caused by interference to all returns from super TRX
- Ratio of uplink returns caused by interference to all super TRXs

The report is sorted out by traffic absorption to super TRXs. Note that this report is not of standard width. In this example the right half of the report is shown under the left one.

```
IUO: KPIs per cell. Average.
```

```
                  between 19981123 and 19981123
            sorted by Traffic absorbtion to super TRXs

                                                  all    super   super     TCH HO
          BTS                                   Traffic Traffic  Absorb    Drop Fail
BSC       ID  BCF NAME      BTS NAME             (Erl)   (Erl)     (%)      (%) (%)
--------- --- ------------- ------------- ------- ------- ------- ------- -------
BSC521    33  SITE AAA      SECTOR A           2.36    2.09   88.53    0.49    1.03
          16  SITE BBB      SECTOR B           0.75    0.65   86.62    1.73    3.88

Raw TCH regular super   reg TCH sup TCH Return  Return  Return          bad CI
Block   Length  Length  Block   Block   DL Qual DL If   UL If            share
(%)     (sec)   (sec)   (%)     (%)     (%)     (%)     (%)     HO att    (%)
------- ------- ------- ------- ------- ------- ------- ------- ------- -------
   0.00    6.70   21.49    0.00    0.00    7.91   28.78    5.04    8527    2.85
   0.68    6.32   17.49    0.00    1.05    6.88   12.17    3.70    3268    4.47
```

Figure 109. Report 403: KPI statistics for IUO cells

The **IUO measurement data per BTS** (404) report shows per BTS the date of the oldest and latest data record and the average duration of the measurement period.

```
===============================================================================


                                                     Oldest        Avg
                                                 BTS Newest     Period
BSC name       BCF name       BTS name            id data        (min) Layers
-------------- -------------- -------------- ---- ---------- ------ ----------
BSC555         WHOU1          WHOU1                1 21.11.98       60 REG, SUP
                                                     26.11.98
```

Figure 110. Report 404: IUO measurement data per BTS

The **Frequency check of adjacent cells (IUO super TRX excluded)** (405) report displays all adjacencies where a cell and its adjacent cell have the same frequency or adjacent frequency on a regular TRX. This report is basically similar to report 062 but it is modified for IUO cells and excludes super TRXs in the check.

```
===============================================================================


       Adjacent cells with same or adjacent frequency check in PLMN network


Source               Source           Target               Target
******               ******           ******               ******
(S)TRX_id(use)       BSC              (S)TRX_id(use)       BSC
(S)BTS_name          BTS id (CI,LAC)  (S)BTS_name          BTS id (CI,LAC)
(S)BCF               freq, NCC, BCC   (S)BCF_name          freq, NCC, BCC
-------------------- ---------------- -------------------- ----------------
(U)1(BCCH)           BSC12            (U)3(BCCH)           BSC12
(U)XXXXXXXXXX1       1 (1016,4270)    (U)YYYYYYYYYYYYY2    23 (1129,4270)
(U)XXXXXXXXXX1       56,5,4           (U)YYYYYYYYYYYYY     56,5,6
```

```
(U)6(TCH)              BSC12                (U)9(TCH)              BSC12
(U)YYYYYYYYYYYY1       4 (1034,4270)        (U)YYYYYYYYYYYY2       38 (1386,4270)
(U)YYYYYYYYYYYY1       83,5,3               (U)YYYYYYYYYYYY1       83,6,5
```

Figure 111. Report 405: Adjacent cells with the same or adjacent frequency, IUO super TRX excluded

The **C/I statistics** (407) report is based on the C/I Ratio measurement, which is an optional BSC feature. It collects data on every call ongoing in the test cell and its interfering cells. The measurement can be activated only for one BTS in one BSC. Interfering cells can consist of either all adjacent cells or 6 given cells.

When a MS is in the test cell, the DL C/I ratio is the ratio of DL signal level of the test cell to that of each interfering cell. When the MS is in the interfering cell, the DL C/I ratio is the ratio of DL signal level of the interfering cell to that of the test cell.

```
===============================================================================

                                 C/I Statistics
          Test Cell  BSC=BSC2UPS1, BCF=1UPS002, BTS=1UPS2005, BTS id=5
                                 LAC=2, CI=20005
                            from 19980622 to 19980622

                                     Test C/I Intf C/I
                                     in band  in band  TCH
Interfering Cell           Sig  BSIC (%)      (%)      hold
**************   Low  Upp  lev  deco ******** ******** time
BSC              Lmts Lmts adjt time DL       DL       (sec)
BCF              **** **** **** **** UL       UL       ******
BTS (BTSid)      Min  Min  Min  Min  Estim    Estim    Test
(LAC,CI)         Max  Max  Max  Max  Worst             Intf
---------------- ---- ---- ---- ---- -------- -------- --------
BSC2UPS1            0   10    0    0   24.3     13.6       4390
3UPS001             0   10    0    0   27.2      4.3       2295
3UPS2001 (1)                            0.0      0.0
(2,20001)                               0.0

BSC2UPS1            0   10    0    0    0.6      0.0       4390
3UPS001             0   10    0    0    2.6      0.0          0
3UPS2002 (2)                            0.0      0.0
(2,20002)                               0.0
```

Figure 112. Report 407: C/I statistics

14 Network configuration

14.1 Network configuration summary

To obtain an overall picture of the network under Nokia NetAct run the report **Network configuration summary** (090).

To see how the MRs are used, run the report **Network configuration summary** (090).

```
================================================================================
=
=                   NETWORK CONFIGURATION SUMMARY
=
=                   Network:            PLMN_TEST_10
=
================================================================================

This report shows statistics about the capacity of the network

- NSS, DX220, SMSC, VMS network entity sums for each MR and total sum.

- BSS network entity sums for each MR and sum over the network.

- BTS sums for each MR and sum over the network per band.

- BSS network entity sums for each MR and sum over the network in sorted out
. by the number of BTSs, for used and not used BCFs, BTSs, TRXs and CHNs
.  BSC TOT: total nbr of BSCs
.  TC TOT : total nbr of transcoders
.  PCM TOT: total nbr of PCMs
.  BCF UNL: nbr of unlocked BCFs
.      LCK: nbr of locked BCFs
.  BTS
.      USD: nbr of used BTSs (BTS and BCF unlocked)
.      NUS: nbr of non-used BTSs (BTS or BCF locked)
.  TRX
.      USD: nbr of used TRXs (TRX, BTS and BCF unlocked)
.      NUS: nbr of non-used TRXs (TRX or BTS or BCF locked)
.  CHN
.      USD: nbr of used Channels (CHN, TRX, BTS and BCF unlocked)
.      NUS: nbr of non-used Channels (CHN or TRX or BTS or BCF locked)
.  ADJ TOT: total nbr of adjacencies

- BSS network entity sums for each MR and sum over network sorted out
. by the number of BTSs, for locked and unlocked BCFs, BTSs, TRXs and CHNs
.  BCF UNL: nbr of unlocked BCFs
.      LCK: nbr of locked BCFs
.  BTS UNL: nbr of unlocked BTSs
.      LCK: nbr of locked BTSs
```

```
.  TRX UNL: nbr of unlocked TRXs
.      LCK: nbr of locked TRXs
.  CHN UNL: nbr of unlocked Channels of TRX (includes signalling chns)
.      LCK: nbr of locked Channels

- Transmission element sums for each MR and sum over the network
.  DMR TOT: total nbr of DMRs
.  DN2 TOT: total nbr of DN2s
.  TRU TOT: total nbr of TRUs
.  TCSM TOT: total nbr of TCSMs

- Averages of entities per higher object (used CHN,TRX,BTS counts applied)


NOTE: Foreign BCF and underlying objects are filtered out.
NOTE: Running this report takes a while. Patience please.

===============================================================================
-

--------------------------------------------------------------------------------
   OMC, NSS, DX, SMS, VMS, SGSN, GGSN, CG  NE Summaries per Maintenance Region
                 (Only objects existing in the network counted)
--------------------------------------------------------------------------------

                   OMC
               OMC  WS HL{R MSC Dx220 VMS SMSC GGSN SGSN   CG
Maint. Region  tot tot tot tot   tot tot  tot  tot  tot  tot
------------- ---- --- --- --- ----- --- ---- ---- ---- ----
non assign                   2                  16
MR-NWI3                                          1
keskuskatu           6   1   3     1                  1
BLUESKY
MR-RANSYVE
              ----     --- --- ----- --- ---- ---- ---- ----
sum                      1   5     1            17    1



--------------------------------------------------------------------------------
               BSS Network Entity Summaries per Maintenance Region
--------------------------------------------------------------------------------

                                                                ADJ
                TC BSC  PCM  BCF        BTS        TRX         tot
Maint. Region  tot tot  tot  usd  nus   usd  nus   usd   nus  in nw
------------- ---- --- ---- ---- ---- ----- ---- ----- ----- ------
MR-NWI3
BLUESKY                                        1
MR-RANSYVE
keskuskatu           7  146   70   48   114   95   361   186     71
non assign          11    3         3     2    3           2     76
              ---- --- ---- ---- ---- ----- ---- ----- ----- ------
sum                 18  149   70   51   116   99   361   188    147


usd = used (object and all abovestanding objects are unlocked)
nus = not used (object or any abovestanding object(s) is locked)

--------------------------------------------------------------------------------
               BSS Network Entity Summaries per Maintenance Region
                            Number of BTSs per Band
--------------------------------------------------------------------------------

              Nbr of BTS Nbr of BTS Nbr of BTS
Maint. Region     GSM900    GSM1800    GSM1900
------------- ---------- ---------- ----------
```

```
BLUESKY
MR-NWI3
MR-RANSYVE
keskuskatu            125         46         39
non assign              8          3          0
              ---------- ---------- ----------
sum                   133         49         39


--------------------------------------------------------------------------------
             BSS Network Entity Summaries per Maintenance Region,
             Directly Locked and Unlocked BCF, BTS, TRX, CHN counts
--------------------------------------------------------------------------------

                BCF        BTS        TRX
Maint. Region   unl  lck   unl  lck   unl  lck
------------- ----- ---- ----- ---- ----- ----
MR-NWI3
BLUESKY                           1
MR-RANSYVE
keskuskatu       70   48   190   19   375   19
non assign             3     3    2          2
              ----- ---- ----- ---- ----- ----
sum              70   51   193   22   375   21


Note: These counts do not take into consideration the state of the abovestanding
objects.


--------------------------------------------------------------------------------
             Transmission Element Summaries per Maintenance Region
--------------------------------------------------------------------------------

              DMR  DN2  TRU TCSM
Maint. Region tot  tot  tot  tot
------------- ---- ---- ---- ----
non assign       3
MR-NWI3
keskuskatu     178        94    6
BLUESKY
MR-RANSYVE
              ---- ---- ---- ----
sum            181        94    6



--------------------------------------------------------------------------------
              BSS Network Entity Averages per Maintenance Region
--------------------------------------------------------------------------------

              avg    avg   avg    avg    avg     avg    avg     avg  avg
              PCM    TC    BCF    BTS    TRX     BTS    TRX     TRX  ADJ
              per    per   per    per    per     per    per     per  per
Maint. Region BSC    BSC   BSC    BSC    BSC     BCF    BCF     BTS  BTS
------------- ------ ----- ------ ------ ------- ------ ------- ---- ------
MR-NWI3                                            --     --      --   --
BLUESKY                                            --     --     0.0
MR-RANSYVE                                         --     --      --   --
keskuskatu      20.9         16.9   29.9    78.1    1.8     4.6  2.6    0.3
non assign       0.3          0.3    0.5     0.2    1.7     0.7  0.4   15.2
```

```
Note: Only those objects are counted which are in use.
```

Figure 113. Report 090: Network configuration summary

14.2 BSC option statistics

The **BSC option statistics** (089) report shows the optional features that are used in the BSCs of the selected BTS area.

```
===============================================================================
=
=                   BSC OPTION STATISTICS
=
=                   Network:       PLMN
=                   Area:          All BTSs selected
=                   Sort by:       BSC option, BSC name
=
=
===============================================================================

All the BSCs in the selected area are reported.


Note: Only the options used in the BSC are listed. Information is updated to
the Nokia NetAct database only at upload.
Later (at the earliest in T11) the data will be updated automatically.

===============================================================================


           BSC Option used                  BSC Name
---------------------------------------- --------------------
C2 Cell Reselection                     NWX_BSC_1
                                        NWX_BSC_2
                                        NWX_BSC_3


Chained Cells                           NWX_BSC_1
                                        NWX_BSC_2
                                        NWX_BSC_3


Directed Retry                          NWX_BSC_1
                                        NWX_BSC_2
                                        NWX_BSC_3


Double BCCH Allocation List             NWX_BSC_1
                                        NWX_BSC_2
                                        NWX_BSC_3


FACCH Call Setup                        NWX_BSC_1
                                        NWX_BSC_2
                                        NWX_BSC_3


Fast Moving MS Handling                 NWX_BSC_1
                                        NWX_BSC_2
                                        NWX_BSC_3
```

```
HO Adjacent Cell Measurements            NWX_BSC_1
                                         NWX_BSC_2
                                         NWX_BSC_3

Intelligent Underlay Overlay             NWX_BSC_1
                                         NWX_BSC_2
                                         NWX_BSC_3

Optimization MS Power Level In HO        NWX_BSC_1
                                         NWX_BSC_2
                                         NWX_BSC_3

Remote Degradation of BTS Service        NWX_BSC_1
                                         NWX_BSC_2
                                         NWX_BSC_3

Remote Inter of BTS Ser and Ver Nbrs     NWX_BSC_1
                                         NWX_BSC_2
                                         NWX_BSC_3

Rnos Usage                               NWX_BSC_1
                                         NWX_BSC_2
                                         NWX_BSC_3

Rx Qual Statistics                       NWX_BSC_1
                                         NWX_BSC_2
                                         NWX_BSC_3

SDCCH Handover                           NWX_BSC_1
                                         NWX_BSC_2
                                         NWX_BSC_3

Underlay-Overlay Statistics              NWX_BSC_1
                                         NWX_BSC_2
                                         NWX_BSC_3
```

Figure 114. Report 089: BSC option statistics

14.3 Network entities

The **Maintenance regions** (091) report lists all maintenance regions in the network and the number of objects in them.

```
ID     Maintenance Region      Int id    OBJECTS

------ ---------------------- ------ ----------

3      ESPOO/SALO              3293          483

1      GSM1800                 6            1248
```

```
5       TAMPERE                 3294          715

2       globalScope             973             1
```

Figure 115. Report 091: Maintenance regions

The **BSCs** (092) report displays all BSCs in the network and the number of BTSs, LAPDs and PCMs under them. Only the BTSs and TRXs having an actual parameter set (i.e. those that exist in the network) are counted.

```
BSCs which are assigned to a Maintenance Region:

              !              !     !       !      !      !      !      !Gb NSVC!
              !              !     !       ! Count! Count! Count! Count!   info!
              !              !     !   INT!    of!    of!    of!    of!   rate!BSC
Maint. Region !Name          !C_NBR!     ID!  LAPD!   PCM!   BTS!   TRX! (kbps)! SW
--------------!--------------!-----!-------!------!------!------!------!----!---
ESPOO         !BSC1KUTOJA    !50264!      8!    65!    16!    29!    46!    768!S9
ESPOO         !BSC2UPS1      !50265!   1112!    55!    16!    33!    50!    704!S9
SALO          !BSC7SALO      !74910!   9833!    60!     7!    26!    51!    832!S9
TAMPERE       !BSC3TRE       !50266!   1920!    17!     6!     5!    14!    128!S9
TAMPERE       !BSC4TRE       !85249!   5909!   156!    27!    61!   113!   3040!S9
TELEKARA      !BSC MERKURIUS !85521!   9834!   164!    34!    70!    97!       !S9
              !              !     !       !------!------!------!------!-----!
sum           !              !     !       !   517!   106!   224!   371!   5472!


BSCs which are not assigned to any Maintenance Region:

              !              !     !       !      !      !      !      !Gb NSVC!
              !              !     !       ! Count! Count! Count! Count!   info!
              !              !     !   INT!    of!    of!    of!    of!   rate!BSC
Maint. Region !Name          !C_NBR!     ID!  LAPD!   PCM!   BTS!   TRX! (kbps)! SW
--------------!--------------!-----!-------!------!------!------!------!-----!---
Undefined     !Foreign BSC   !0    !   3461!     0!     0!     1!     1!       !
Undefined     !vivBSC        !99911!  15464!     0!     0!     0!     0!       !
              !              !     !       !------!------!------!------!------!
sum           !              !     !       !     0!     0!     1!     1!       !
```

Figure 116. Report 092: BSCs

The **MSCs** (093) report lists all MSCs in the network.

```
ID     MSC Name          Int id
------ ----------------- ------
50359  MSC1KUTOJA        17
```

Figure 117. Report 093: MSCs

The **HLRs** (094) report lists all HLRs in the network.

ID	HLR Name	Int id
50377	HLR1KUTOJA	16

Figure 118. Report 094: HLRs

The **Base station sites of a maintenance region** (095) report lists all base station sites (BCF objects) of the selected maintenance region in alphabetical order. The host BSC is shown as well as the number of BTSs (sectors) in each base station.

Note that the number of BTSs counts only those BTSs which exist in the network, not those which exist in the database only.

BCF name	BCF id	Host BSC	Nbr of BTS in nw
1UPS002	2	BSC2UPS1	3
3UPS001	1	BSC2UPS1	3
5KOM005	5	BSC2UPS1	3

Figure 119. Report 095: Base station sites of a maintenance region

In the **Location areas** (096) report the identifiers of all location area codes (LAC) used in the network are presented with the number of cells (BTS) under each LA. You may need this information when dimensioning the paging resources.

Location Area Code	Number of BTSs
1	18
2	18
3	9
4	37

Figure 120. Report 096: Location areas

The **PLMNs** (097) report lists all PLMNs created in the Nokia NetAct database and the number of objects in them.

Note that normally there should be only one PLMN in the database. If there is more than one, the network name in the report headers may not appear correctly.

PLMN id	PLMN name	PLMN Int id	Child object class	Child object name

```
PLMN      PLMN                            1 BSC         BSC1KUTOJA
                                                        BSC2UPS1
                                                        BSC3TRE
                                                        Foreign BSC
                                                        BSC4TRE
                                            MSC         MSC1KUTOJA
                                            HLR         HLR1KUTOJA
                                            MR          GSM1800
                                                        globalScope

                                                        ESPOO/SALO
                                                        TAMPERE
                                            OMC         OMC_Kutoja

                                            SMSC        SMSC-1
                                            RTR         router
```

Figure 121. Report 097: PLMNs

Segment configuration report (054)

```
===============================================================================
=
=              SEGMENT CONFIGURATION
=
=              Network:              PLMN
=              Area:                 BSC1KUTOJA
=              Segment selection:    Segments with common BCCH feature
=
===============================================================================

===============================================================================

          !          !             !      !              !          !
          !BSC       !             !   SEG!              !BCF       !
BSC       !Id        !Segment      !    Id!BCF           !Id        !
----------!----------!-------------!------!--------------!----------!
BSC1KUTOJA!50264     !TKARACOSITYYY!    39!TEK Talk      !12        !
                                          !TEK_UltraSite !11        !

                     !TKARACOSITXXX!    40!TEK Talk      !12        !
                                          !TEK_UltraSite !11        !

                     !TKARACOSITZZZ!    41!TEK Talk      !12        !
                                          !TEK_UltraSite !11        !


              !          !
              !BTS       !
BTS           !Id        !
--------------!----------!------------
TKARACOSITE060!39        !Master BTS
TKARACOSIT060 !36        !

TKARACOSITE170!40        !Master BTS
TKARACOSIT170 !37        !

TKARACOSITE300!41        !Master BTS
TKARACOSIT300 !38        !
```

Figure 122. Report 054: Segment configuration

14.4 BSC and BCF software deployment

To see the occurrences of different BSC software releases in a BTS area, run report 200 or 204.

```
BCF Software package used
(only default package is counted)
(Only BCFs above used BTSs counted)          COUNT
---------------------------------------- ----------
D51_1_REL                                        28
DF60_10REL                                       59
DF60_1PRE5                                        1
INSITE2REL                                       35
INSITE2_REL                                      27
METROCX20_1                                       1
METRO_2PREREL                                    18
METRO_CXM3PRE11                                   4
PUE1_PRE                                          3
UCX3PRE10                                         2
ULTRACX3PRE6                                      3
ULTRAPRE1_1                                       2
ULTRA_CX3PRE11                                    2
ULTRA_PU103                                      20
ULTRA_PU104                                       1
ULTRA_PU10_3                                      4
ULTRA_REL1                                        3

Note: For a full BCF software deployment list, run report 099.
```

Figure 123. BCF and BSC software deployment in report 204, Network benchmark statistics.

14.5 BCF hardware type deployment

To see the occurrences of different BCF hardware releases in a BTS area, run report 200 or 204.

```
                                 Amount of
BCF HW Type                      used BCFs
------------------------------ -----------
TalkFamily                              35
PrimeSite                                5
MetroSite                               16
InSite                                  62
UltraSite                               17
```

Figure 124. Occurrences of different BCF hardware releases in a BTS area in report 204, Network benchmark statistics.

To see the deployment of different BCF hardware types in a BTS area, run the report **BCF software and hardware type statistics** (099).

```
===============================================================================
=
=                   BCF SOFTWARE AND HARDWARE TYPE STATISTICS
=
=                   Network:       PLMN
=                   Area:          BSC - BSCabc
=                   Sort by:       Package ID,BSC,BCF
=
=
===============================================================================

All the BCFs in the selected area are reported.

BCF HW type description:

BCF Type     Product names
---------    -------------------
2nd gen      Nokia 2nd generation
TalkFamily   Nokia Talk-family
PrimeSite    Nokia PrimeSite
InSite       Nokia InSite
MetroSite    Nokia MetroSite
UltraSite    Nokia UltraSite

Note : Only the default software package for BCF are listed.

===============================================================================


Package ID           BSC Name        BCF Name        Status       BCF Type
-------------------- --------------- --------------- ------------ ----------
BTSSWDF2_0_1         BSC11           TEST             NEW         TalkFamily

DF2_1_1              BSC11           Site aaa         BACK-UP     TalkFamily
                     BSC11           Site bbb         BACK-UP     TalkFamily
                     BSC11           Site ccc         BACK-UP     TalkFamily
```

Figure 125. Report 099: BCF software and hardware type statistics

14.6 Frequencies

To see the occurrences of frequencies in a BTS area, run the report **Occurrence of frequencies** (110).

```
===============================================================================
=
=                   OCCURRENCE OF FREQUENCIES
=
=                   Network:      PLMN
=                   Area:         BSC - BSC1KUTOJA
=
===============================================================================

This report shows the number of occurrences of each frequency.
Only frequencies of used TRXs (TRX and its parent objects are unlocked)
are counted.

===============================================================================
```

```
-


                 Nbr
                  of
Frequency occurences
--------- ----------
       78          1
      592          2
      594          1
      595          2
      597          1
      598          1
      599          2
      600          1
      601          2
      604          1
      605          2
      769          1
      773          1
      775          2
     1007          1
     1009          1
          ----------
sum               22
```

Figure 126. Report 110: Occurrence of frequencies

The frequency plan is the basic setting of the network. Since the plan is very often inserted manually via Nokia NetAct, errors may easily occur.

To see the frequency plan of a BTS area, run the report **Frequency plan** (111).

```
===============================================================================
=
=                   FREQUENCY PLAN
=
=                   Network:          PLMN
=                   Area:             All BTSs selected
=                   Sorting key:      freq, bcc
=                   Filter:           All shown
=
===============================================================================

This report shows the frequency plan related information about the BTS.
The following data is given for each TRX:

TRX freq             TRX frequency (intital)

TRX use
.                    BCCH = BCCH used in TRX
.                    TCH  = BCCH not used in TRX

BCC                  Base station colour code
NCC                  Network colour code

BCF, BTS, TRX states
.                    N = No state
.                    U = Unlocked
.                    S = Shutting down
.                    L = Locked
```

```
Hopping              If Rf hopping is used, the MA list ID is shown and
.                    the MA list can be found in the end of the report.

HSN1                 Hopping sequence number
MAIO                 MAIO parameters.  MAIO offset : MAIO step

BCCH tsl0            Channel type of time slot 0 of BCCH TRX
BCCH tsl1            Channel type of time slot 1 of BCCH TRX

Running this report takes a while. Patience please.

===============================================================================
                                       Frequency plan. All BTSs selected

                                                   TRX  BCCH         BCF
                                           LAC     **** *******      BTS
BSC name       BTS name                    RAC  TRX freq tsl0    BCC TRX   Hopping:HSN1
(BTS id)       BCF name                     CI   id use  tsl1    NCC state MAIO
-------------- ---------------- ------ ---- ---- ------- --- ----- ------------
BSC7SALO       MONITORI10                    2    2 0              2 UUL   None:
(10)           MONITORI004                  72      TCH            7       0:1
                                           710

BSC MERKURIUS  GSM900                      700    2 1    MBCCB     0 ULL   None:
(66)           M5                          255      BCCH TCHF      7       0:1
                                         64100

BSC7SALO       KIILA01                       1    2 1              1 UUL   None:
(1)            KIILA001                     71      TCH            7       0:1
                                           701

(report cut here)

                                       Carrier frequencies of the MA list id for RF hopping

                    MA
                    list
BSC Name            id          Frequency
-------------------- ---------- ---------
BSC MERKURIUS       1                 770
                                      772
                                      774
                                      776
                    2                 770
                                      772
                                      776
                    3                 770
                                      774
                                      776
                    4                 772
                                      774
                                      776
                    5                 773
                                      780
BSC1KUTOJA          1                 845
                                      853
                                      857
                    2                 761
                                      841
                                      849
BSC2SAPO            1                 592
                                      598
                                      604
                    2                 599
                    3                 771
                    4                1013
```


DN98614186
Issue 2-2 en

```
BSC7SALO             2                780
                                      786
```

Figure 127. Report 111: Frequency plan

To see where a particular frequency is used, run the report **Find cells having the given frequency** (047).

```
================================================================================
=
=                    FIND CELLS HAVING THE GIVEN FREQUENCY
=
=                    Network:   PLMN
=                    Area:      LAC - 2
=                    Frequency: 778
=
================================================================================

This report displays all cells which have the given frequency.

================================================================================
                            Cells with frequency 778

BSC name             (BTS id) BTS name
(BCF id) BCF name    NCC  BCC             TRX        Channel    Channel
admin.state          admin.state          adm.st.    type       adm.st.
-------------------- -------------------- ---------- ---------- ----------
BSC2UPS1             (1) 3UPS2001         5          MBCCHC     unlckd
(1) 3UPS001          NCC:7   BCC:7        unlckd
unlckd               unlckd

                                                     SDCCB      unlckd
                                                     TCHF       unlckd
                                                     TCHF       unlckd
                                                     TCHF       unlckd
                                                     TCHF       unlckd
                                                     TCHF       unlckd
                                                     TCHF       unlckd
```

Figure 128. Report 047: Find cells having the given frequency

15 Alarms

This chapter introduces part of the alarm reports provided by BSS Network Doctor.

15.1 Alarm types and counts

To analyse the stability of the network first on the network level, use the report **Alarm types and counts** (034).

```
===============================================================================

                    Types and counts of alarms
          between 19991117 and 19991117 in PLMN network

                                                                        Amount
Object Urg  Alarm                                                           of
class  cl   ident Alarm name                                            alarms
------ --- ------ -------------------------------------------------- ------
BSC    W      690 WORKING STATE CHANGE                                   539
              270 DEFAULT PACKAGE NOTICE                                  50
              691 AUTOMATIC RECOVERY ACTION                               10
               27 SOFTWARE PACKAGE FALLBACK COPYING NOTICE                 2
               73 SIGNALLING LINK REMOTE UNBLOCKED                         2
              422 TIME UPDATED                                             2
                2 OSI INCOMING CALL ROUTING FAILED                         1
             1001 UNIT RESTARTED                                           1
               36 FILE UPDATES TO DISK RESUMED                             1
              590 PROCESSING OF ALARMS IS STARTED ANEW                     1
               33 FILE UPDATES TO DISK PREVENTED                           1

       ***   8050 LOSS OF INCOMING 2M SIGNAL                               1

       **    9122 MEASUREMENT DATA HAS NOT ARRIVED FROM NETWORK ELE       16
             2970 LOSS OF SUPERVISION CONNECTION                           5
             2175 OSI CLNS LINKAGE NOT AVAILABLE                           1
             2185 ROUTING OF OSI OUTGOING CALL FAILED                      1
             2394 ERROR IN FINISHING FALLBACK COPYING                      1

       *     8186 CONFIGURATION ERROR                                      2
             2477 GLOBAL RESET MESSAGE RECEIVED                            1
             2478 MOBILE ACCESS CLASSES ABNORMAL                           1
             9228 ALARM DATABASE UPLOAD IN PROGRESS                        1
             2948 RADIO NETWORK INITIALIZATION                             1


BTS    W     7710 OBJECT ADMINISTRATIVE STATE CHANGED                      4

       ***   7767 BCCH MISSING                                            26
```

```
TRX     W      7708 TRX RESTARTED                                              4
               7710 OBJECT ADMINISTRATIVE STATE CHANGED                        1

        ***    8099 RECEIVED BIT ERROR RATIO (BER) > 1E-3                    395

        **     7733 COMMUNICATION FAILURE WITH TRX                             9
               7132 TRX/CU: TXUx SYNTHESIZER NOT LOCKED,                       3
               7730 CONFIGURATION OF BCF FAILED                                2
               8081 LOSS OF FRAME ALIGNMENT                                    2

        *      7129 TRX/CU: TXUx OUTPUT POWER DECREACED                        1
               7705 LAPD FAILURE                                               1
               7715 CONTINUOUS RESTARTS OF BCF/TRX                             1
```

Figure 129. Report 034: Alarm types and counts

This report tells you which are the most frequent alarms in the network. Some of the alarms may then be analysed further.

On the BSC level, **Alarm types and counts for BSC** (035) checks thre Nokia NetAct database for different types of alarms and lists the alarm urgency class, amount of alarm, alarming object, alarm ID and alarm name for each alarm type within the given period and selected BSC(s). The list is sorted out by urgency class and number of alarms.

```
===============================================================================

                               Types and counts of alarms
                        between 19980613 and 19980623 in all BSC

    Amount
Urg     of Object  Alarm
cl  alarms class   ident Alarm name
--- ------ ------ ------ --------------------------------------------------
W       61 BSC       422 TIME UPDATED
        40 BSC      1072 SIGNALLING LINK OUT OF SERVICE
        12 BTS      7710 OBJECT ADMINISTRATIVE STATE CHANGED
         9 TRX      1565 MEAN HOLDING TIME BELOW DEFINED THRESHOLD
         9 TRX      1567 CHANNEL FAILURE RATE ABOVE DEFINED THRESHOLD
         9 TRX      7708 TRX RESTARTED
         8 BTS      1568 CH CONGESTION IN BTS ABOVE DEFINED THRESHOLD
         7 LAPD     1254 UNSOLICITED DATA LINK RE-ESTABLISHMENT
         6 BCF      7710 OBJECT ADMINISTRATIVE STATE CHANGED
         2 BCF      7721 COMMUNICATION FAILURE WITH BCF
         1 BSC         9 OSI FORCED CONNECTION CLEARING
         1 BSC      1078 PROCESS EXCEPTION
         1 BSC      1007 RESTARTED PROGRAM BLOCK

***     20 BTS      2567 BCCH MISSING
         4 TRX      7842 NO BCCH TRANSMISSION ACTIVATED
         2 TRX      7900 NO CONNECTION TO TRX
         2 TRX      7942 TX ANTENNA FAULTY
         1 TRX      7210 BCF/OMU: NO RESPONSE FROM THE UNIT
         1 TRX      7723 FAILURE IN SENDING SYSTEM INFORMATION TO BTS SITE

**      25 TRX      2739 MEAN HOLDING TIME ABOVE DEFINED THRESHOLD
        17 TRX      7538 SIGNALLING ERROR IN ABIS INTERFACE
         9 DN2      2972 DYNAMIC NODE INTERFACE UNIT FAULT
         7 BCF      8075 S ALARM RECEIVED
         6 TRX      7941 TX ANTENNA PERFORMANCE DEGRADED
```

```
        5 TRX       7139 TRX/CU: NO PARAMETERS GIVEN TO UNIT
        4 BSC       9122 RECEIVING MEASUREMENT DATA FROM A NETWORK ELEMENT
        2 BSC       2250 FAILURE IN D-CHANNEL ACTIVATION OR RESTORATION
        2 BSC       2384 MEMORY USAGE OVERFLOW
        2 TRX       7317 TRX/XUPx: POWER SUPPLY OUTPUT FAILURE
        2 BCF       7991 POWER SUPPLY FAULT
        2 BCF       8112 FREQUENCY ERROR
        2 BCF       8153 FAULT IN TRANSMITTER
        2 BCF       8128 FAULT IN EQUIPMENT
        2 BCF       8066 ALARM INDICATION SIGNAL (AIS) RECEIVED
        2 TRX       7316 TRX/XUPx: POWER SUPPLY MAINS FAILURE
        1 BSC       2075 COMMUNICATION FAILURE BETWEEN SIGNALLING TERMINAL
        1 TRX       7530 TX OUTPUT POWER LEVEL DECREASED
        1 TRX       7533 TX ANTENNA OR COMBINER CONNECTION FAULTY
        1 BCF       8099 BIT ERROR RATE (BER) > 10E-3
        1 BCF       8081 LOSS OF FRAME ALIGNMENT
        1 BCF       8080 RBUS FRAME ERROR
        1 BCF       8059 INCORRECT INCOMING SIGNAL LEVEL
        1 BCF       2730 CONFIGURATION OF BCF FAILED
        1 TRX       7524 TX FREQUENCY TUNER OUT OF ORDER
```

Figure 130. Report 035: Alarm types and counts for BSC

Sometimes you may come across a situation when, for example, a BTS alarm appears under the BSC object in these statistics. The reason for this is that the object sending the alarm does not exist in Nokia NetAct.

To study the frequency of interesting alarms, use the report **BSC alarm breakdown** (030).

15.2 Number of alarms per object

Report 036 shows the number of alarms per object type. It has two parts, the first of which gives the alarm statistics by alarm severity class, the second part showing the common statistics.

The objects BCF, BTS, and TRX counted in this report are real working ones, that is all of them are unlocked and their parents are unlocked.

```
===============================================================================

                                 Part 1
                       Number of alarms per object
                 between 19981120 and 19981121 in PLMN network
                           Alarm severity: ***

                                            Amount
                                 Amount        per
Object Object  Alarm                per     object
class  amount amount             object        day
------ ------ ------ ---------- ----------
BTS       978     19       0.02       0.01
PCM       667      1       0.00       0.00
TRX      3244   1559       0.48       0.24
BCF       437      2       0.00       0.00
SXC         7     20       2.86       1.43
```

```
                                   Part 1
                         Number of alarms per object
                between 19981120 and 19981121 in PLMN network
                             Alarm severity: **

                                        Amount
                              Amount       per
Object Object  Alarm             per    object
class  amount amount          object       day
------ ------ ------ ---------- ----------
BSC        21     65       3.10       1.55
BTS       978      4       0.00       0.00
TRX      3244   1525       0.47       0.24
BCF       437   8323      19.05       9.52
LAPD     3833      2       0.00       0.00
MSC         7    377      53.86      26.93
HLR         3      6       2.00       1.00
WS          5      1       0.20       0.10
SXC         7      4       0.57       0.29
                                   Part 1
                         Number of alarms per object
                between 19981120 and 19981121 in PLMN network
                              Alarm severity: *

                                        Amount
                              Amount       per
Object Object  Alarm             per    object
class  amount amount          object       day
------ ------ ------ ---------- ----------
BSC        21     17       0.81       0.40
PCM       667      3       0.00       0.00
TRX      3244     43       0.01       0.01
BCF       437     44       0.10       0.05
LAPD     3833     18       0.00       0.00
MSC         7      5       0.71       0.36
WS          5      1       0.20       0.10
SXC         7     86      12.29       6.14
                                   Part 1
                         Number of alarms per object
                between 19981120 and 19981121 in PLMN network
                              Alarm severity: W

                                        Amount
                              Amount       per
Object Object  Alarm             per    object
class  amount amount          object       day
------ ------ ------ ---------- ----------
BSC        21    550      26.19      13.10
BTS       978     10       0.01       0.01
TRX      3244    764       0.24       0.12
BCF       437      4       0.01       0.00
                                   Part 2
                         Number of alarms per object
                between 19981120 and 19981121 in PLMN network

                                        Amount
                              Amount       per
Object Object  Alarm             per    object
class  amount amount          object       day
------ ------ ------ ---------- ----------
BSC        21    632      30.10      15.05
BTS       978     33       0.03       0.02
PCM       667      4       0.01       0.00
TRX      3244   3891       1.20       0.60
BCF       437   8373      19.16       9.58
LAPD     3833     20       0.01       0.00
MSC         7    382      54.57      27.29
HLR         3      6       2.00       1.00
```

WS	5	2	0.40	0.20
SXC	7	110	15.71	7.86

Figure 131. Report 036: Number of alarms per object

15.3 Alarm statistics

To obtain an overall picture of the alarm flow from network elements, run the report **Alarm statistics** (020).

==

Alarm statistics by alarm severity classes
in PLMN network for all MRs

Alarm Severity	mon 26 MAR	tue 27 MAR	wed 28 MAR	thu 29 MAR	fri 30 MAR	sat 31 MAR	sun 01 APR	mon 02 APR	tue 03 APR	wed 04 APR
***	851	141	151	288	191	57	20	129	107	46
**	286	130	323	227	168	64	160	347	175	185
*	669	715	676	759	374	96	79	156	164	115
W	13943	15794	15551	15551	9665	3970	3533	5590	5471	3580
sum	15749	16780	16701	16825	10398	4187	3792	6222	5917	3926

Alarm statistics by source network entity
in PLMN network for all MRs

Network Entity	mon 26 MAR	tue 27 MAR	wed 28 MAR	thu 29 MAR	fri 30 MAR	sat 31 MAR	sun 01 APR	mon 02 APR	tue 03 APR	wed 04 APR
BS	607	457	666	837	628	412	439	711	602	368
BSC	182	176	191	248	230	86	78	164	175	152
DMR				2	3					
DN2					1				3	
HLR	7322	8351	7775	7713	5174	2148	1898	3412	3088	2065
MSC	6491	6405	6638	6575	3720	1415	1213	1736	1931	1254
OMC					1			1		
Other	1147	1391	1431	1449	641	126	164	198	118	88
SGSN					1					
TRU				1						
sum	15749	16780	16701	16825	10399	4187	3792	6222	5917	3927

Figure 132. Report 020: Alarm statistics

15.4 Alarm statistics by cells

The **Alarm statistics by cells** (023) report lists the occurrences of a selected alarm over a selected period of time, showing in detail when, for how long and where it occurred.

```
            Alarm 7710 Statistics per cell from 19990619 to 19990621

                                                   ALM
                                                  HOLD BTS /
START        START    END         END             TIME BCF /
DATE         TIME     DATE        TIME           (sec) BSC
----------- -------- ----------- -------- -------- --------------------
1999-JUN-21 12:45:51 hold        hold              SANKUD2021
                                                   SANKUD010
                                                   BSC2UPS1

1999-JUN-21 12:41:43 hold        hold              SANKUD2020
                                                   SANKUD010
                                                   BSC2UPS1

1999-JUN-21 12:40:53 hold        hold              SANKUD2021
                                                   SANKUD010
                                                   BSC2UPS1

1999-JUN-21 12:40:28 hold        hold              SANKUD2020
                                                   SANKUD010
                                                   BSC2UPS1
```

Figure 133. Report 023: Alarm statistics by cell

15.5 Active BCCH missing (2567, 7767) alarms

The 'BCCH missing' alarm stands for cell outage. In the **Active BCCH missing alarms** (024) report these alarms are listed per BTS in chronological order.

```
START        START    END    BCF NAME /           BSC

DATE         TIME     DATE   BTS NAME             NAME
----------- -------- ------ -------------------- -------------
1998-NOV-30 11:17:11  hold  HIOMO015             BSC2
                            HIOMO013

1998-NOV-17 13:41:11  hold  HIOMO015             BSC2
                            HIOMO013
```

Figure 134. Report 024: Active BCCH missing alarms

15.6 Alarm sum time by cells

The **Alarm sum time by cells** (025) report shows the sum time of the selected alarm, which is calculated for each BTS (cell) in minutes over the given period.

Note

Note: Alarm sum times calculation covers also those alarms that have been started or canceled outside the period. For these alarms the counting starts from period start and/or ends to period end.

```
===============================================================================
=
=                 ALARM SUM TIME BY CELLS
=
=                 Network:     PLMN
=                 Area:        All BTSs selected
=                 Alarm ID:     7767
=                 Alarm txt:   BCCH MISSING

=                 Period:      20011126 from 20011202
=
===============================================================================

The sum time of selected alarm is calculated for each BTS (cell) in minutes
over the given period.

Note: Alarm sum times calculation covers also those alarms that have been
started or canceled outside the period. For these alarms the counting starts
from period start and/or ends to period end.

===============================================================================

                           Statistics of Alarm  7767

                                                                Time
BTS name                   BSC name               Total          Sum
BCF Name                   (BTS id)            Occurance        (min)
------------------------- --------------- --------- ----------
KUTOJAIV240                BSC1KUTOJA                 6    6671.35
KUTOJA001                  (3)
                                                                          {
M4TKLAB                    BSC MERKURIUS              4    4913.90
BTS M4 Q1=25               (63)

VILJAMNIC                  BSC2SAPO                   1    3398.12
                           (20)
(report cut here)


ALMARE39                   BSC4TRE                    1       0.03
                           (39)

                                               --------- ----------
avg                                                   2     194.41
sum                                                 209   24496.22

The selected area has been    1.3 % down out of total time.

Note that downtime % has been counted against the total BTS time which
```

```
is counted based on the nbr of used BTS (unlocked BTS under unlocked BCF
at the momement of query) and nbr of days selected.
```

Figure 135. Report 025: BTS alarm sum time by cells

16 Locating network elements

The reports introduced in this chapter allow you to find specific data on various network elements.

16.1 All base station sites per maintenance region

The **All base station sites per maintenance region** (041) report lists all base station sites of the selected maintenance region in alphabetical order. The number of cells (BTSs) in each base station is counted for all existing BTSs in the network (i.e. which have <ACTUAL> as the parameter set name).

```
                                                     Nbr of BTS
MR name    BCF name        BSC (BCF id)              in network
---------- --------------- -------------------- ----------
GSM1800    1UPS002         BSC2UPS1         (2)            3
GSM1800    3UPS001         BSC2UPS1         (1)            3
GSM1800    5KOM005         BSC2UPS1         (5)            3
GSM1800    HIPPOS009       BSC2UPS1         (9)            3
GSM1800    KILO007         BSC1KUTOJA       (7)            3
GSM1800    KILONKALLIO008  BSC1KUTOJA       (8)            3
GSM1800    KUTOJA001       BSC1KUTOJA       (1)            2
GSM1800    MAKKYL006       BSC2UPS1         (6)            3
GSM1800    SUOSAA004       BSC1KUTOJA       (4)            2
                                                     ----------
sum                                                           25
```

Figure 136. Report 041: All base station sites per maintenance region

16.2 All BTSs with LAC and CI

The **All BTSs with LAC and CI** (043) report lists the CIs, LACs and names of all cells in the selected maintenance region sorted according to CI and LAC. The search is done only for the cells which have <ACTUAL> as the parameter set name, i.e. those that exist in the network.

```
                         Cells with LAC and CI

   LAC CELL ID BTS NAME                         BCF NAME
------ ------- ------------------------------ ------------------------------
```

```
   12      12                                SOFIE
   13      13 JARI1                          KURRI
   51      67 INSITE2                        KURRI
  111     111                                KURRI
   12     122 TRY1                           KURRI
   27     154 JARI1                          KURRI
   51     230 LARKE1                         KURRI
          240 LARKE2                         KURRI
          430 KEVIN1                         KURRI
   27    1260 TESTBTS127                     FANTOM
         1290 TESTBTS128                     FANTOM
   69    1900 MCRAE1                         KURRI
   27    1950 WENDY1                         KURRI
         2030 SALONEN1                       FANTOM
  112    2211 KOE3                           KURRI
   27   10101 KURTIS                         FANTOM
  100   27272                                FANTOM
```

Figure 137. Report 043: All cells with LAC and CI

16.3 BS sites having the given character string in the name

The **Find BS sites having the given character string in the name** (044) report displays all BCFs or BTSs which have the given string in the name.

Note

The search string is case sensitive and the search is done based on the BCF name.

```
                     Cells with HATA string in BCFs name

BSC name             (BTS id) BTS name    (TRX id)
(BCF id) BCF name    NCC  BCC             freq.                              PCM/TSL
BCF adm.st.          BTS adm.st.          adm.state  Ch.type adm.st.    /SUBTSL
-------------------- -------------------- ---------- ------- ---------- -------
BSC3TRE              (1) HATANP3001       (1)        TCHF    unlckd     34/1/0
(1) HATANP001        NCC:7   BCC:0        ARFN:769
unlckd               unlckd               unlckd

                                                     TCHF    unlckd     34/1/1
                                                     TCHF    unlckd     34/1/2
                                                     TCHF    unlckd     34/1/3
                                                     TCHF    unlckd     34/2/0
                                                     TCHF    unlckd     34/2/1
                                                     TCHF    unlckd     34/2/2
                                                     TCHF    unlckd     34/2/3
```

Figure 138. Report 044: Find BS sites having the given character string in the name

16.4 Cells having the given CI and LAC

The **Find cells having the given CI and LAC** (045) report displays all cells (BTSs) which have the given cell identity and location area code.

```
BSC          BCF name (BCF if)    BTS name (BTS id)           LAC         CI
------------ -------------------- -------------------- ---------- ----------
BSC1KUTOJA   KUTOJA001 (1)        KUTOJA1001 (1)                1      10001
```

Figure 139. Report 045: Find cells having the given CI and LAC

16.5 Cells having an adjacent cell with the given CI and LAC

The **Find cells having an adjacent cell with the given CI and LAC** (046) lists the data from all BTSs in a network.

```
            Cells having an adjacent cell with the CI=10001 and LAC=1
BSC          BCF BTS                  LAC   CI    INT_ID
------------ --- -------------------- ----- ----- ------
BSC1KUTOJA   7   12-KILO1012          1     10012 138
BSC1KUTOJA   7   13-KILO1013          1     10013 141
BSC1KUTOJA   8   15-KKALLI1015        1     10015 147
BSC1KUTOJA   4   7-                   1     10007 77
```

Figure 140. Report 046: Find cells having an adjacent cell with the given CI and LAC

17 Named sets

The **Number of named parameter sets per object type** (080) report shows the number of named sets for BTS objects. Actual, Lastomc, Default, Backup and Clipboard sets are not counted. If the number is high (thousands in the whole network), it should be studied if the sets are really needed. The next step is to study the names.

```
===============================================================================

   BSC    BCF    BTS    POC    HOC   LAPD    TRX    CHN
   SET    SET    SET    SET    SET    SET    SET    SET
 COUNT  COUNT  COUNT  COUNT  COUNT  COUNT  COUNT  COUNT
------ ------ ------ ------ ------ ------ ------ ------
     0      0      0    185    158      0    458   3440
```

Figure 141. Report 080: Number of named parameter sets

The **Named sets used** (081) report shows all named sets used in a maintenance region or network. Actual, Lastomc, Default and Clipboard sets are not presented because they are usual. The next step is to study how a particular name is allocated in the network.

```
===============================================================================

BSC NAMED SETS
==============

no rows selected


BTS NAMED SETS
==============

no rows selected


BCF NAMED SETS
==============

no rows selected
```

```
HOC NAMED SETS
==============

SET NAMES
--------------------
130398upskoko
bu100398
down_2_4
horseshoe1
nointracellho
npsx
npsx100201
npsx110204
npsxhh
npsxiuo
npsxiuoall
npsxiuomakk
npsxiuomakky
npsxlop

14 rows selected.


POC NAMED SETS
==============

no rows selected


TRX NAMED SETS
==============

SET NAMES
--------------------
1
100398
130398
130398upsb
130398upskoko
130398upskokob
```

Figure 142. Report 081: Named sets used

The **Allocation of a named set** (082) report shows the allocation of the given named set on the area.

```
===============================================================================


BSC NAMED SETS
==============

no rows selected


BCF NAMED SETS
==============

no rows selected


BTS NAMED SETS
==============
```

```
no rows selected

HOC NAMED SETS
==============

no rows selected

POC NAMED SETS
==============

no rows selected

TRX NAMED SETS
==============

SET_NAME             NAME            BCF NAME            BTS TRX
-------------------- --------------- --- --------------- --- ---
demo050502           BSC1KUTOJA      1   KUTOJA1001      1   1
demo050502           BSC1KUTOJA      1   KUTOJA1001      1   2
demo050502           BSC1KUTOJA      1   KUTOJA1002      2   3
demo050502           BSC1KUTOJA      1   KUTOJA1002      2   4
```

Figure 143. Report 082: Allocation of a named set

18 Half/Full rate

BSS Network Doctor provides one dedicated report, **Cells having max. HTCH traffic** (236), for Half/Full rate:

```
================================================================================
                         Cells having max. HTCH traffic
                          between 20011017 and 20011017

                                avail
                                TSLs          FTCH           HTCH
                                *****    FTCH busy      HTCH busy
                                HR    congest ****   congest ****
BSC             BCF Name        FR       time avg       time avg
 (BTS id)       BTS Name        dual        % max          % max
--------------- --------------- ----- ------- ------ ------- ------
BSC2SAPO        KUTOJA5KRS        3.0     0.0   0.00     0.0   0.00
(1)             3UPS001           0.0           0.00           0.00
                                  0.0

BSC2SAPO        3UPSULTRA2002     0.0     0.0   0.00     0.0   0.00
(2)             3UPS001           3.0           0.00           0.00
                                  0.0

BSC2SAPO        5KOM2009          0.0     0.0   0.00     0.0   0.00
(9)             5KOM005           7.0           0.00           0.00
                                  0.0
```

Figure 144. Report 236: Cells having max. HTCH traffic

The following BSS Network Doctor reports also contain information about Half/Full rate:

- **Cell Doctor** (213) contains all parameters and counters to investigate one cell on the most detaild level. The Resource Availability measurement and Traffic measurement contain most counters about half rate.
- **Network Benchmark Statistics** (204) provides information on FTCH/HTCH call time split and congestion.

19 GPRS

BSS Network Doctor provides several reports on GPRS collected into one menu, **BSS Performance Management > GPRS**.

- **GPRS KPI** (229) contains the most useful formulas that have been identified so far. You can run this report with different resolution options: area/BSC/BTS for objects and total/daily/hourly for time.

  The output is in tabular format with delimiters that make it easy to copy the contents to PC applications. It should be noted though that the formulas used are not yet tested in live networks with commercial GPRS traffic rather are the first choice after testing the reports in the Nokia trial network.

  Note that the layout of this report is extra wide.

- **UL PS traffic** (237) provides PSW traffic related information (traffic split by RLC block types). You can run this report with different resolution options: area/BSC/BTS for objects and total/daily/hourly for time. The output is in tabular format with delimiters that make it easy to copy the contents to PC applications.
- **DL PS traffic** (238) provides PSW traffic related information (traffic split by RLC block types). You can run this report with different aggregation options: area/BSC/BTS for objects and total/daily/hourly for time. The output is in tabular format with delimiters.
- **Territory upgrades and downgrades** (239) provides BTS level information about territory upgrade and downgrade. You can run this report with different aggregation options: area/BSC/BTS for objects and total/daily/hourly for time. The output is in tabular format with delimiters.
- **Cells by multislot allocations** (228) provides a BTS list with details on multislot requests and allocations.
- **TBF PI** (254) shows the TBF related PIs
- **Frame relay, detailed** (240) provides bearer and DLC1...5 level information about the frames sent between BSC and SGSN. The report is on total time aggregation level.
- **Frame relay, short** (243)

- **Cell Doctor. Most GPRS counters in PCU measurement .** (213) contains all parameters and counters to investigate one cell on the most detaild level. The *Packet Control Unit measurement* contains most of the GPRS counters which are related to TBFs and RLC blocks. In the *Resource Availability measurement* there are also useful counters related to the GPRS territory.
- **GPRS counters** (235) provides a view on counters of the Packet Control Unit measurement, GPRS counters from Traffic, Resource access and Resource availability measurements on the area level.
- **Cell related SGSN counters** (700) provides BTS area level sums of all SGSN counters that are available on BTS level.

Some of these reports are located also in some other menus (051, 103 and 213). By centralising all reports to a dedicated menu it is easier for the user to find what reports are available for GPRS.

In addition to the above mentioned reports the following reports from other menus contain some GPRS related information:

- **Network configuration summary** (090) : counts of GGSN, SGSN, and CG in the network
- **Cells having maximum paging traffic** (186): Gb buffer occupancy
- **Networ benchmark statistics** (204): TCH / PDTCH capacity allocation
- **Cell Analyser** (216): Gb buffer load

Note

In order to make it easier to focus on GPRS cells an option ’All BTSs having GPRS traffic’ has been added to the BTS area selection list which is used by most of the reports.

19.1 GPRS KPI (229)

This report allows you to generate a GPRS KPI table with various object and time aggregation levels.

The table is sorted by RLC data volume trf_74 (UL and DL) if time aggregation is the whole period. Otherwise it is BSC, BTS id and time.

This report is normally used so that you first run the report with average time aggregation and when finding an interesting BTS, zoom in to that by using the daily or hourly time aggregation.

Avoid using hourly time aggregation with large BTS areas and long periods of time since they result in long output and higher load on the system.

Table 7. KPI columns in report 229, GPRS KPI

Column description	Counter/ formula	Explanation
CS traffic peak (erl)	trf_109	Absolute CS traffic peak on normal TRXs
CS normal traffic ave (erl)	trf_97	Average CS traffic on normal TRXs.
Unavail normal TCH	uav_13	Timeslots unavailable for any traffic on normal TRXs.Capacity total CS
Capacity total CS	ava_21a ava_21a	Average number of timeslots that can be used for CS traffic on normal TRXs.
Capacity dedic PS	ava_17a	Average number of timeslots in dedicated PS territory (PS is always on normal TRXs).
TCH usage free %	trf_86b	Average remaining free capacity.
TCH usage CS %	trf_83a	TCH capacity usage by CS traffic
TCH usage CS %	trf_84b	TCH capacity usage by PS traffic.
Territory CS	ava_28	Number of timeslots in CS
Territory PS	ava_16a	Number of timeslots in PS territory (dedicated+default+possible addit.ch.)
GPRS traffic UL (erl)	trf_78a	Amount of UL PS traffic expressed in erlangs
GPRS traffic DL (erl)	trf_79a	Amount of DL PS traffic expressed in erlangs.
Imm. Assign NACK (%)	blck_13	Ratio of NACK in CS immediate assignment/reject. May indicate AG buffer capacity problems
P-Imm. Assign NACK (%)	blck_21	Ratio of NACK in PS immediate assignment/reject. May indicate AG buffer capacity problems
PS territory utilisation (%)	trf_96	Utilisation ratio of GPRS
Addit. GPRS ch.use (tsl)	ach_1	Average used additional timeslots for GPRS.
GPRS territory upgrade req	c1174	Requests for territory upgrade from PCU (request for additional channels)
GPRS territory ugrade reject (%)	blck_22	Rejections of requests for territory upgrade from PCU.
GPRS territory downgrade req	c1181	Requests for territory downgrade from PCU (release of additional channels).

Table 7. KPI columns in report 229, GPRS KPI (Continued)

Column description	Counter/ formula	Explanation
Ave paging buffer Gb occupancy (%)	pgn_6	Average paging buffer Gb occupancy.
Max paging buffer Gb occupancy (%)	c3050	Absolute peak paging buffer Gb occupancy
TBF establ. UL	c72000	Number of TBFs established in UL
TBF establ. DL	c72005	Number of TBFs established in DL.
TBF released due CS traf UL (%)	tbf_19	Share of TBFs released due to high CS traffic. UL
TBF released due CS traf DL (%)	tbf_20	Share of TBFs released due to high CS traffic. DL
TBF released due flush UL (%)	tbf_35	Share of TBFs released due to flush. UL
TBF released due flush DL (%)	tbf_36	Share of TBFs released due to flush. DL
Average timeslotl thruput per TBF UL	tbf_37b	Average number of UL TBFs per timeslot
Average timeslotl thruput per TBF DL	tbf_38b	Average number of DL TBFs per timeslot
TBF duration (sec) UL	tbf_5a	Average duration of normally released TBF UL.
TBF duration (sec) DL	tbf_6a	Average duration of normally released TBF DL.
TBF success (%)	tbf_34	Overall TBF performance. UL and DL together.
TBF drops (MS lost) per 10kbyte UL	tbf_27b	Note: these can also be slow realloctions.
TBF drops (MS lost) per 10kbyte DL	tbf_28b	Note: these can also be slow realloctions.
Mslot blck UL (%)	tbf_15	Share of rejected allocations due to lack of resources
Mslot blck DL (%)	tbf_16a	Share of rejected allocations due to lack of resources
UL tsl avg.nbr requested	msl_13	Average multislot amount requested, UL (see also report 228)
UL tsl allocated (%)	msl_15a	How well the requested multislots could be provided, UL (see also report 228)
DL tsl avg.nbr requested	msl_14	Average multislot amount requested, DL (see also report 228)
DL tsl allocated (%)	msl_16a	How well the requested multislots could be provided, DL (see also report 228)
Effective thruput per used tsl UL	trf_72d	Payload throughput per average used timeslot (kbps/tsl), UL
Effective thruput per used tsl DL	trf_73d	Payload throughput per average used timeslot (kbps/tsl), DL

Table 7. KPI columns in report 229, GPRS KPI (Continued)

Column description	Counter/ formula	Explanation
Avg.effective tsl thruput per TBF UL	trf_123	Average effective tsl thruput per TBF (kbps/tsl/TBF), UL. Works correctly with BSC S10 CD 3.0
Avg.effective tsl thruput per TBF DL	trf_124	Average effective tsl thruput per TBF (kbps/tsl/TBF), DL. Works correctly with BSC S10 CD 3.0
Total thruput per used tsl UL	trf_89	Gross throughput per average used timeslot (kbps/tsl), UL
Total thruput per used tsl DL	trf_90	Gross throughput per average used timeslot (kbps/tsl), DL
DL LLC discarded frames (%)	llc_1	Share of LLC PDUs discarded due to expiry, DL
UL LLC discarded data (%)	llc_2	Share of LLC bytes discareded due to nonavail. NSE, UL
ACK BLER UL CS1 (%)	rlc_10b	Retransmission ratio of UL CS1 blocks, ack mode
ACK BLER UL CS2 (%)	rlc_11c	Retransmission ratio of UL CS2 blocks, ack mode
ACK BLER DL CS1 (%)	rlc_12a	Retransmission ratio of DL CS1 blocks, ack mode
ACK BLER DL CS2	rlc_13	Retransmission ratio of DL CS2 blocks, ack mode
Data UL ack CS1 (%)	rlc_6b	Share of UL CS1 ack data out of CS1-CS2, UL and DL data (see also report 237)
Data UL unack CS1 (%)	rlc_6c	Share of UL CS1 unack data out of trf_74b (see also report 237)
Data UL ack CS2 (%)	rlc_7a	Share of UL CS2 ack data out of trf_74b (see also report 237)
Data DL CS1 ack (%)	rlc_8b	Share of DL CS1 ack data out of trf_74b (see also report 237)
Data DL CS1 unack (%)	rlc_8c	Share of DL CS1 unack data out of trf_74b (see also report 237)
Data DL ack CS2 (%)	rlc_9a	Share of DL CS2 ack data out of trf_74b (see also report 237)
Total RLC payload data (kbyte)	trf_74b	Sum of CS1-CS2, UL and DL data (ack and unack).

19.2 UL PS traffic (237)

The UL PS traffic (237) report provides PSW traffic related information

```
================================================================================
=
=             UL PS TRAFFIC
=
=             Network:            PLMN
=             Area:               All BTSs having GPRS traffic selected
=             Period:             from 20010627 to 20010627
=             Hours selection:    all hours counted
=             Time aggregation:   whole period
=             Object aggregation: BTS
=             Threshold:          Traffic (trf_78a) >= 0 erl
=
================================================================================

This report shows the uplink PS traffic and its components.

CS1 ack (%)                  /rlc_1   Traffic share of UL CS1 blocks, ack mode
CS1 unack (%)               /c72066   Traffic share of UL CS1 blocks , unack mode
CS2 (%)                     /c72064   Traffic share of UL CS2 blocks
                                      (CS2 always ack mode)
MAC (%)                     /c72076   Traffic share of UL MAC blocks
Bad CS1 ack (%)             /c72070   Traffic share of UL CS1 bad frames
Bad CS1 unack (%)           /c72073   Traffic share of UL CS1 unack bad frames
Bad CS2 (%)                 /c72071   Traffic share of UL CS2 bad frames
                                      (CS2 always ack mode)
Ignor BSN (%)               /c72072   Traffic share of blocks ignored due to BSN
RLC blocks total            /rlc_14   Sum of data all RLC blocks (above listed)
Average PS Traffic (erl)  /trf_78a    PS traffic counted as erlang (ave busy tsl)

List is ordered by the traffic but in case daily or hourly time aggregation
it is ordered by the object and time.

Measurement used: PCU

Note: To see raw counters run report 213 for the BTS concerned.

================================================================================

             !                     !               !   !      !      !      !
             !                     !               !   !   CS1!   CS1!      !
             !                     !               !   !   ack! unack!   CS2!
             !                     !               !BTS!   (%)!   (%)!   (%)!
BSC          !BCF                  !BTS            !id ! rlc_1!c72066!c72064!
-------------!---------------------!---------------!---!------!------!------!
BSC4TRE      !OULUNMP              !OULUNMP        !70 !   0.0!   0.0!  33.7!
BSC4TRE      !1800_3Ail            !7HERMIA3A      !7  !   0.0!   0.0!  51.8!
BSC4TRE      !EGSM_3Cil            !42HERMIA3CIVHUO!42 !   0.0!   0.0!  43.4!
BSC4TRE      !3C1krs               !24HERMIA3C1KRS !24 !   0.0!   0.0!  37.8!


      !   Bad!   Bad!      !      ! Average!
      !   CS1!   CS1!   Bad! Ignor!     PS!       RLC
   MAC!   ack! unack!   CS2!   BSN! Traffic!    blocks
   (%)!   (%)!   (%)!   (%)!   (%)!   (erl)!     total
c72076!c72070!c72073!c72071!c72072! trf_78a!    rlc_14
------!------!------!------!------!--------!----------
  16.7!   0.0!   0.0!   1.5!  48.1!   0.097!    104921
  20.4!   0.0!   0.0!   6.8!  21.0!   0.047!     42184
```

```
  20.6!   0.0!   0.0!   4.4!  31.6!   0.026!     32720
  26.6!   0.0!   0.0!   2.4!  33.2!   0.018!      9843
```

Figure 145. Report 237: UL PS traffic

19.3 DL PS traffic (238)

```
===============================================================================
=
=              DL PS TRAFFIC
=
=              Network:            PLMN
=              Area:               All BTSs having GPRS traffic selected
=              Period:             from 20010627 to 20010627
=              Hours selection:    all hours counted
=              Time aggregation:   whole period
=              Object aggregation: BTS
=              Threshold:          Traffic (trf_78a) >= 0 erl
=
===============================================================================

This report shows the downlink PS traffic and its components.

CS1 ack (%)         /c72063-c72067   Traffic share of UL CS1 blocks, ack mode
CS1 unack (%)              /c72067   Traffic share of UL CS1 blocks, unack mode
CS2 (%)                    /c72065   Traffic share of UL CS2 blocks
                                     (CS2 always ack)
MAC (%)                    /c72077   Traffic share of UL MAC blocks
                                     (dummy blocks included)
Retra CS1 (%)              /c72068   Traffic share of UL retransmitted CS1 frames
Retra CS2 (%)              /c72069   Traffic share of UL retransmitted CS2 frames
RLC blocks total            rlc_15   Sum of data all RLC blocks (above listed)
Average PS Traffic (erl)  /trf_79a   PS traffic counted as erlang (ave busy tsl)

List is ordered by the traffic but in case daily or hourly time aggregation
it is ordered by the object and time.

Measurement used: PCU

Note: Running this report takes a while. Patience please.
Note: To see raw counters run report 213 for the BTS concerned.

===============================================================================


             !                     !                !   !      !      !      !
             !                     !                !   !  CS1!   CS1!      !
             !                     !                !   !  ack! unack!   CS2!
             !                     !                !BTS!  (%)!   (%)!   (%)!
BSC          !BCF                  !BTS             !id !      !c72067!c72065!
-------------!---------------------!----------------!---!------!------!------!
BSC4TRE      !1800_3Ail            !7HERMIA3A       !7  !   0.0!   0.0!  82.9!
BSC4TRE      !OULUNMP              !OULUNMP         !70 !   0.0!   0.0!  30.0!
BSC4TRE      !EGSM_3Cil            !42HERMIA3CIVHUO!42 !   0.0!   0.0!  80.0!
BSC4TRE      !EGSM_3Cil            !41HERMIA3CIVHUO!41 !   0.0!   0.0!  69.4!


      !      !      ! Average!
      ! Retra! Retra!      PS!       RLC
   MAC!   CS1!   CS2! Traffic!    blocks
   (%)!   (%)!   (%)!   (erl)!     total
c72077!c72068!c72069! trf_79a!    rlc_15
```

```
------!------!------!--------!----------
  16.0!   0.0!   1.1!   0.145!    130482
  70.0!   0.0!   0.0!   0.137!    147975
  19.8!   0.0!   0.2!   0.065!     81857
  30.0!   0.0!   0.6!   0.037!     79531
```

Figure 146. Report 238:DL PS Traffic

19.4 Territory upgrade and downgrade (239)

```
===============================================================================
=
=              TERRITORY UPGRADE, DOWNGRADE
=
=              Network:             PLMN
=              Area:                All BTSs selected
=              Period:              from 20020502 to 20020603
=              Hours selection:     all hours counted
=              Time aggregation:    whole period
=              Object aggregation: BTS
=
===============================================================================

With BTS level summary the list is ordered by territory upgrade requests
otherwise it is ordered by the object and time.
Upgrade reject ratios are counted in ratio to counter c1174.

Upgrade requests from PCU      c1174
Upgrade rejects, total       blck_22
Upgrade rejects, CSW           c1176 Upgrade requests rejected due to the high
.                                     load of the circuit switched traffic.
Upgrade rejects, PSW           c1177 Upgrade requests rejected because BTS
.                                     has not enough resources capable of GPRS.
Upgrade rejects, PCU           c1177 Upgrades rejected because PCU congestion.
Upgrade incompl                c1175 Upgrade requests served with less radio
.                                    time slots than requested.
Addit.channel seizures         ach_3 Nbr of additional channels seizures.
Downgrade requests from PCU    c1181 When additional channel(s) not needed
.                                    anymore.
Upgrades due to decr.CS traffic
.                              c1180 Upgrades to fulfill the default GPRS
.                                    territory when CS traffic decreases.
.                                    Initiated by MCMU.
Downgrades due to incr.CS traffic
.                              c1179 GPRS territory downgrade in order to
.                                    maintain the margin of idle TCHs
.                                    for cCS traffic. Initiated by MCMU.

Measurement used: Traffic, Resource Availability

===============================================================================
              !     !                        !   !                        !    !
              !     !                        !   !                        !    !
              !     !                        !   !                        !    !
              !BSC  !                        !BCF!                        ! BTS!
BSC           !id   !BCF                     ! id!BTS                     !  id!
--------------!-----!------------------------!---!------------------------!----!
BSC4TRE       !85249!JKYLA                   !94 !JKYLA                   !  94!
BSC2SAPO      !50265!INSITE-74               !74 !BARCELONA74             !  74!
BSC2SAPO      !50265!KUTOJA5KRS              !1  !KUTOJA5KRS              !   1!
BSC4TRE       !85249!25 Hermia 5A3           !25 !56 Hermia 5A3           !  56!
BSC4TRE       !85249!26 Hermia 5A3           !26 !57 Hermia 5A3           !  57!
```

```
        !       !       !       !       !       !        !         !
 Upgrade!  =====!Upgrade!rejects!=====  !Upgrade!  Addit.!Downgrade!
requests!  total!    CSW!    PSW!    PCU!incompl! channel! requests!
from PCU!    (%)!    (%)!    (%)!    (%)!    (%)!seizures! from PCU!
   c1174!blck_22!  c1176!  c1177!  c1178!  c1175!   ach_3!    c1181!
--------!-------!-------!-------!-------!-------!--------!---------!
    1636!    0.0!    0.0!    0.0!    0.0!    0.0!    1609!     1591!
     811!    0.0!    0.0!    0.0!    0.0!    0.0!    1175!      591!
     106!    0.0!    0.0!    0.0!    0.0!    0.0!     167!       95!
     101!    1.0!    1.0!    0.0!    0.0!   19.8!     244!      100!
      93!   23.7!   23.7!    0.0!    0.0!   20.4!     140!       64!

Upgrades!Downgrades
  due to!    due to
 decr.CS!   incr.CS
 traffic!   traffic
   c1180!     c1179
--------!----------
       0!         0
       0!         0
       0!         0
       9!        10
      79!        83
```

Figure 147. Report 239:Territory upgrade, downgrade

19.5 Cells by multislot requests and allocations (228)

```
===============================================================================
=
=                   CELLS BY MULTISLOT REQUESTS AND ALLOCATIONS
=
=                   Network:   PLMN
=                   Area:      All BTSs having GPRS traffic selected
=                   Period:    from 20010227 to 20010305
=
===============================================================================

Req UL            /msl_9   Number of UL tsl requests
Req DL           /msl_10   Number of DL tsl requests
All UL           /msl_17   Number of UL tsl allocation
All DL           /msl_18   Number of DL tsl allocations
Blocked UL       /c72079   Number of UL tsl rejections (lack of radio res.)
Blocked DL       /c72080   Number of DL tsl rejections (lack of radio res.)
UL req(%) 1TSL   /c72034   Share of 1TSL requests out of all requests  (UL)
.         2TSL   /c72035   Share of 2TSL requests out of all requests
.         3TSL   /c72036   Share of 3TSL requests out of all requests
.         4TSL   /c72037   Share of 4TSL requests out of all requests
.         5_8TSL /c72038   Share of 5-8 TSL requests out of all requests
UL all(%) 1TSL   /c72044   Share of 1TSL allocations out of all allocations
.         2TSL   /c72045   Share of 2TSL allocations out of all allocations
.         3TSL   /c72046   Share of 3TSL allocations out of all allocations
.         4TSL   /c72047   Share of 4TSL allocations out of all allocations
.         5_8TSL /c72048   Share of 5-8 TSL allocations out of all allocations
DL req(%) 1TSL   /c72039   Share of 1TSL requests out of all requests  (DL)
.         2TSL   /c72040   Share of 2TSL requests out of all requests
.         3TSL   /c72041   Share of 3TSL requests out of all requests
.         4TSL   /c72042   Share of 4TSL requests out of all requests
.         5_8TSL /c72043   Share of 5-8 TSL requests out of all requests
```

```
DL all(%) 1TSL   /c72049   Share of 1TSL allocations out of all allocations
.         2TSL   /c72050   Share of 2TSL allocations out of all allocations
.         3TSL   /c72051   Share of 3TSL allocations out of all allocations
.         4TSL   /c72052   Share of 4TSL allocations out of all allocations
.         5_8TSL /c72053   Share of 5-8 TSL allocations out of all allocations

List is ordered by the total nbr of requests.

Measurement used: PCU

Note: Running this report takes a while. Patience please.

===============================================================================

                   Cells by multislot requests and allocations
                          between 20010227 and 20010305

                                                       UL req UL all DL req DL all
                                                       (%)    (%)    (%)    (%)
                                                       ****   ****   ****   ****
                                                       1TSL   1TSL   1TSL   1TSL
                  Req      All      Blocked            2TSL   2TSL   2TSL   2TSL
BTS               ****     ****     ****               3TSL   3TSL   3TSL   3TSL
 BCF              UL       UL       UL                 4TSL   4TSL   4TSL   4TSL
 BSC (BTSid)      DL       DL       DL                 5_8TSL 5_8TSL 5_8TSL 5_8TSL
----------------- -------- -------- -------- ------ ------ ------ ------
RD06              938      938      0            80     80     38     38
 KIILA002         578      578      0            20     20     32     32
 BSC7SALO (6)                                     0      0     30     30
                                                  0      0      0      0
                                                  0      0      0      0

HATANP3001        92       92       0            99     99     48     48
 HATANP001        163      163      0             1      1     37     37
 BSC3TRE (1)                                      0      0     15     15
                                                  0      0      0      0
                                                  0      0      0      0

61HERMIA6KRS4     9        9        0           100    100     60     60
 Hermia 6C 4 GSM  5        5        0             0      0      0      0
 BSC4TRE (61)                                     0      0     40     40
                                                  0      0      0      0
                                                  0      0      0      0
```

Figure 148. Cells by multislot requests and allocations (228)

19.6 TBF PI (254)

```
===============================================================================
=
=              TBF PI
=
=              Network:            PLMN
=              Area:               All BTSs selected
=              Period:             from 20020927 to 20020927
=              Hours selection:    all hours counted
=              Time aggregation:   whole period
=              Object aggregation: BTS
=
===============================================================================

This report shows the TBF related PIs.
```

The list is sorted by the number of UL TBFs but in case of daily or hourly time aggregation by the object and time.

Measurement used: PCU

Note: To see raw counters run report 213 for the BTS concerned.

```
===============================================================================

          !     !          !   !               !    !
          !     !          !   !               !    !
          !BSC  !          !BCF!               ! BTS!
BSC       !id   !BCF       ! id!BTS            !  id!
----------!-----!----------!---!---------------!----!
BSC7SALO  !74910!BSC7SALO  !13 !KAMPA36        !  36!
BSC7SALO  !74910!BSC7SALO  !8  !SIILO24        !  24!
BSC7SALO  !74910!BSC7SALO  !2  !RD06           !   6!
BSC7SALO  !74910!BSC7SALO  !7  !SIILO21        !  21!
BSC7SALO  !74910!BSC7SALO  !1  !KIILA01        !   1!

   ******!***** UL! all ***!********!********!*****    !
   establ!peak dur! avg dur!peak sim! avg TBF! peak TBF!
         !   (sec)!   (sec)!        ! per tsl!  per tsl!
   c72000! c72001!  tbf_5a!  c72002! tbf_37b!   c72103!
---------!--------!--------!--------!--------!---------!
     1605!     2.6!     0.6!       1!     0.0!        0!
      857!    18.6!     0.6!       5!     0.0!        0!
      845!    13.4!     0.6!      12!     0.0!        0!
      666!     7.5!     0.5!       5!     0.0!        0!
       73!     6.8!     0.5!       1!     0.0!        0!

         !         !         !         !             !             !
   ******!***** UL !release**!*********!*************!********      !
  CS traf!  no resp!    flush!  suspend!EGPRS no resp!TBF estab fail!
   c72054!   c72056!   c72058!   c72060!       c72094!        c72092!
---------!---------!---------!---------!-------------!--------------!
        0!        1!        0!        0!            0!             0!
        0!        1!        0!        0!            0!             0!
        0!        0!        1!        0!            0!             2!
        0!        2!        0!        0!            0!             0!
        0!        1!        0!        1!            0!             0!

   ******!**** DL ! all ***! *******!********!*****    !
   establ!peak dur! avg dur!peak sim! avg TBF! peak TBF!
         !   (sec)!   (sec)!        ! per tsl!  per tsl!
   c72005! c72006!  tbf_6a!  c72007! tbf_38b!   c72104!
---------!--------!--------!--------!--------!---------!
        7!    10.1!     4.4!       1!     0.0!        0!
      191!   209.2!     5.7!       4!     0.0!        0!
      152!   104.9!     4.3!      11!     0.0!        0!
      102!   143.6!     5.4!       5!     0.0!        0!
       16!    21.1!     5.3!       1!     0.0!        0!

         !         !         !         !             !             !
   ******!*******DL!release**!*********!*************!********      !
  CS traf!  no resp!    flush!  suspend!EGPRS no resp!TBF estab fail!
   c72054!   c72056!   c72058!   c72060!       c72095!        c72093!
---------!---------!---------!---------!-------------!--------------!
        0!        1!        1!        0!            0!             0!
        0!        3!        3!        0!            0!             0!
        0!        0!        1!        0!            0!             0!
        0!        6!        6!        0!            0!             0!
```

```
       0!        1!        1!        3!            0!             0!


    ******!**** UL !unack **!********!*****     !
    establ!peak dur! avg dur!peak sim!      TBF!
          !   (sec)!   (sec)!        !    EGPRS!
    c72010!  c72011!   tbf_7!  c72012!   c72090!
---------!--------!--------!--------!---------!
         0!     0.0!     0.0!       0!        0!
       317!   162.0!     0.4!       2!        0!
         0!     0.0!     0.0!       0!        0!
       148!    82.0!     0.4!       1!        0!
         0!     0.0!     0.0!       0!        0!

     *****!****** DL!unack **!********!*****    !        UL!        DL
    establ! peak dur! avg dur!peak sim!      TBF!       TBF!       TBF
          !    (sec)!   (sec)!        !    EGPRS!     EGPRS!     EGPRS
    c72015!   c72016!   tbf_8!  c72017!   c72091!    c72088!    c72089
---------!---------!--------!--------!---------!---------!---------
         0!      0.0!     0.0!       0!        0!         0!         0
       127!   3064.0!     3.9!       2!        0!         0!         0
         0!      0.0!     0.0!       0!        0!         0!         0
        58!   1607.0!     3.4!       1!        0!         0!         0
         0!      0.0!     0.0!       0!        0!         0!         0
```

Figure 149. TBF PI (254)

19.7 Frame relay, detailed (240)

Table 8. Columns in report 240, Frame relay (detailed)

Column description	Counter/ formula	Explanation
.send	frl_7	Sending to SGSN (busiest measurement period in sending)
rec	frl_8	Receiving from SGSN (busiest measurement period in receiving)
to unoper	c74006	Bearer is changed unoperational because of N392 errors in N393 polling events
ret oper	c74007	Bearer returns operational (N392 pollings without errors)
unava (%)	uav_12	Percentual share of time when bearer is unoperational
HDLC errors per kbyte:Check seq.	frl_3	Frames received with frame check sequence error divided by total of kbytes in received frames

Table 8. Columns in report 240, Frame relay (detailed) (Continued)

Column description	Counter/ formula	Explanation
Other	frl_4	Frames received with an error that differs from counters c74000 and c74001 divided by total of kbytes in received frames
Wrong DLCI	c74001	Frames with wrong DLCI.
Status msg:		
wrng send sn	c74004	Received STATUS message has an unexpected send sequence number.
wrng rec sn	c74005	Receive sequence number of a STATUS message does not correspond to the send sequence number of the last STATUS ENQUIRY.
PVC uknown	c74008	STATUS messages with an unknown PVC status information element
sent too oft	c74008	STATUS messages sent too often.
T391 expir	c74003	No response to the last STATUS ENQUIRY is received. T391 expires.
Sent frames	c74012	
Discar sent frames	c74016	Frame cannot be sent on the PVC (PVC inactive)
Recvd frames	c74014	Frames received without errors.
Discar recvd frames	c74018	Frame is received on an inactive PVC.
Kbytes in sent frames	c74013	
Bytes in discar sent frames	c74017	Bytes in discarded sent frames (PVC inactive)
Kbytes in recvd frames	c74015	Frames received without errors.
Bytes in discar recvd frames	c74019	Bytes in discarded received frames (PVC inactive)
Bytes in discar UL NS data	c74022	Discarded uplink NS unit data due to uplink congestion

19.8 Frame relay, short (243)

Table 9. Columns in report 243, Frame relay (short)

Column description	Counter/ formula	Explanation
send	frl_7	Sending to SGSN (busiest measurement period in sending)
rec	frl_8	Receiving from SGSN (busiest measurement period in receiving)
to unoper	c74006	Bearer is changed unoperational because of N392 errors in N393 polling events.
ret oper	c74007	Bearer returns operational (N392 pollings without errors)
unava (%)	uav_12	Share of time (%) when the bearer is unoperational.
HDLC errors per kbyte:Check seq.	frl_3	Frames received with frame check sequence error divided by total of kbytes in received frames
Other	frl_4	Frames received with an error that differs from counters c74000 and c74001 divided by total of kbytes in received frames
Wrong DLCI	c74001	Frames with wrong DLCI
Status msg:		
wrng send sn	c74004	Received STATUS message has an unexpected send sequence number.
wrng rec sn	c74005	Receive sequence number of a STATUS message does not correspond to the send
ENQUIRY.		
PVC uknown	c74008	STATUS messages with an unknown PVC status information element.
sent too oft	c74009	STATUS messages sent too often.
T391 expir	c74003	No response to the last STATUS ENQUIRY is received. T391 expires.
Sent frames	frl_9	Frames sent without errors.
Discarded sent frames	frl_11	Frame can not be sent on the PVC (PVC inactive)
Recvd frames	frl_10	Frames received without errors.
Discarded received frames	frl_12	Frame is received on an inactive PVC.

Table 9. Columns in report 243, Frame relay (short) (Continued)

Column description	Counter/ formula	Explanation
Kbytes in sent frames	frl_1	Kbytes in frames sent without errors.
Bytes in discarded sent frames	frl_5	Bytes in discarded sent frames (PVC inactive)
Kbytes in recvd frames	frl_2	Kbytes in frames received without errors.
Bytes in discarded received frames	frl_6	Bytes in discarded received frames (PVC inactive)
Bytes discarded UL NS-VC congestion	frl_13a	Bytes discarded UL NS_VC congestion

19.9 GPRS counters (235)

```
===============================================================================
=
=                   GPRS COUNTERS
=
=                   Network:          test-plmn
=                   Area:             All BTSs selected
=                   Period:           from 2002102000 to 2002103113
=
===============================================================================

This report gives the sum (or maximum in the case of peak value counter) of
all GPRS counters. These figures can be used for verifying the KPI formulas or
learnig about the basic counter level.
If you need hourly counter values per cell, use report 213.

===============================================================================


===============================================================================
=
=                    PCU MEASUREMENT
=                    Measurement used: p_nbsc_packet_control_unit
=
===============================================================================

UL_TBF_WITH_RETRY_BIT_SET:      480

NBR_OF_UL_TBF :                 0
UL_TBF_UNACK_MODE:              240
UL_TBF_RE_ALLOCATIONS:          648
UL_TBF_REALLOC_FAILS:           768
UL_TBF_REALLOC_DUE_SIM_DL_TBF:  720
REQ_UL_TBF_DURING_DL_TBF:       1776
EGPRS_TBFS_UL:                  2112
EGPRS_TBFS_UL_IN_UNACK_MODE:    2160

NBR_OF_DL_TBF:                  120
DL_TBF_UNACK_MODE:              360
DL_TBF_RE_ALLOCATIONS:          672
DL_TBF_REALLOC_FAILS:           792
DL_REALLOC_DUE_TERR_DOWNGR:     2520
DL_TBF_REALLOC_DUE_SIM_UL_TBF:  744
```

```
REQ_DL_TBF_DURING_UL_TBF:        1800
EGPRS_TBFS_DL:                   2136
EGPRS_TBFS_DL_IN_UNACK_MODE:     2184

MAX_DUR_UL_TBF:                  1
MAX_DUR_UL_TBF_UNACK_MODE:       11
MAX_DUR_DL_TBF:                  6
MAX_DUR_DL_TBF_UNACK_MODE:       16

AVE_DUR_UL_TBF_SUM:              72
AVE_DUR_UL_TBF_DEN:              964
AVE_DUR_UL_TBF_UNACK_MODE_SUM:   312
AVE_DUR_UL_TBF_UNACK_MODE_DEN:   1204

AVE_DUR_DL_TBF_SUM:              192
AVE_DUR_DL_TBF_DEN:              1084
AVE_DUR_DL_TBF_UNACK_MODE_SUM:   432
AVE_DUR_DL_TBF_UNACK_MODE_DEN:   1324

MAX_NBR_SIM_UL_TBF:              48
MAX_SIM_UL_TBF_UNACK_MODE:       288
MAX_SIM_DL_TBF:                  7
MAX_SIM_DL_TBF_UNACK_MODE:       17

AVE_UL_LLC_PER_TBF_SUM:          504
AVE_UL_LLC_PER_TBF_DEN:          1396

AVE_DL_LLC_PER_TBF_SUM:          552
AVE_DL_LLC_PER_TBF_DEN:          1444

MAX_UL_LLC_PER_TBF:              25
MAX_DL_LLC_PER_TBF:              26

AVER_TBFS_PER_TSL_UL_SUM:        2376
AVER_TBFS_PER_TSL_UL_DEN:        3268

AVER_TBFS_PER_TSL_DL_SUM:        2424
AVER_TBFS_PER_TSL_DL_DEN:        3316

MAX_TBFS_PER_TSL_UL:             103
MAX_TBFS_PER_TSL_DL:             104


REQ_1_TSL_UL:                    816
REQ_2_TSL_UL:                    840
REQ_3_TSL_UL:                    864
REQ_4_TSL_UL:                    888
REQ_5_8_TSL_UL:                  912

ALLOC_1_TSL_UL:                  1056
ALLOC_2_TSL_UL:                  1080
ALLOC_3_TSL_UL:                  1104
ALLOC_4_TSL_UL:                  1128
ALLOC_5_8_TSL_UL:                1152
NO_RADIO_RES_AVA_UL_TBF:         1896

UL_TBF_REL_DUE_CSW_TRAFFIC:      1296
UL_TBF_REL_DUE_NO_RESP_MS:       1344
UL_TBF_REL_DUE_TO_FLUSH:         1392
UL_TBF_REL_DUE_TO_SUSPEND:       1440
UL_TBF_ESTABLISHMENT_FAILED:     2208
UL_EGPRS_TBF_REL_DUE_NO_RESP:    2256

DL_TBF_REL_DUE_CSW_TRAFFIC:      1320
DL_TBF_REL_DUE_NO_RESP_MS:       1368
DL_TBF_REL_DUE_TO_FLUSH:         1416
DL_TBF_REL_DUE_TO_SUSPEND:       1464
DL_TBF_ESTABLISHMENT_FAILED:     2232
```

```
DL_EGPRS_TBF_REL_DUE_NO_RESP:    2280

REQ_1_TSL_DL:                    936
REQ_2_TSL_DL:                    960
REQ_3_TSL_DL:                    984
REQ_4_TSL_DL:                    1008
REQ_5_8_TSL_DL:                  1032

ALLOC_1_TSL_DL:                  1176
ALLOC_2_TSL_DL:                  1200
ALLOC_3_TSL_DL:                  1224
ALLOC_4_TSL_DL:                  1248
ALLOC_5_8_TSL_DL:                1272
NO_RADIO_RES_AVA_DL_TBF:         1920

REALLOC_DUE_TERR_DOWGR:          696


RLC_DATA_BLOCKS_UL_CS1:          1488
RLC_DATA_BLOCKS_UL_CS2:          1536
RLC_MAC_CNTRL_BLOCKS_UL:         1824
BAD_FRAME_IND_UL_CS1:            1680
BAD_FRAME_IND_UL_CS2:            1704
IGNOR_RLC_DATA_BL_UL_DUE_BSN:    1728

DISC_UL_LLC_DATA:                1944

RLC_DATA_BLOCKS_DL_CS1:          1512
RLC_DATA_BLOCKS_DL_CS2:          1560
RLC_MAC_CNTRL_BLOCKS_DL:         1848
RETRA_RLC_DATA_BLOCKS_DL_CS1:    1632
RETRA_RLC_DATA_BLOCKS_DL_CS2:    1656
DUMMY_DL_MAC_BLOCKS_SENT:        2544

DISC_LLC_BLOCKS_DUE_TO_EXP:      1872

RLC_DATA_BLOCKS_UL_UNACK:        1584
BAD_FRAME_IND_UL_UNACK:          1752
RLC_DATA_BLOCKS_DL_UNACK:        1608


PACKET_CH_REQ:                   1968
PAC_PAG_REQ_FOR_CS_PAG:          1992
PACKET_IMMED_ASS_MSG:            2016
PACKET_IMMED_ASS_ACK_MSG:        2040
PACKET_IMMED_ASS_NACK_MSG:       2064
PACKET_IMMED_ASS_REJ_MSG:        2088
PACKET_IMMED_ASS_DL_DRX_MSG:     2328
PACKET_IMMED_ASS_DL_NON_DRX:     2352
PACKET_IMMED_ASS_UL_MSG:         2304

================================================================================
=
=                     TRAFFIC MEASUREMENT
=                     Measurement used: p_nbsc_traffic
=
================================================================================

GPRS_TER_UPGRD_REQ:                   0
INCOMPL_SERV_GPRS_TER_UPGR_REQ:       0
GPRS_TER_UG_REJ_DUE_CSW_TR:           0
GPRS_TER_UG_REJ_DUE_LACK_PSW:         0
GPRS_TER_UG_REJ_DUE_LACK_PCU:         0
GPRS_TER_UG_DUE_DEC_CSW_TR:           0
GPRS_TER_DOWNGRADE_REQ:               0
GPRS_TER_DG_DUE_INC_IN_CSW_TR:        0

================================================================================
```

```
=
=                    RESOURCE ACCESS MEASUREMENT
=                    Measurement used: p_nbsc_res_access
=
===============================================================================

AVE_DRX_AGCH_LOAD_AIR_DEN:           6668
AVE_DRX_AGCH_LOAD_AIR_SUM:           4346
AVE_NON_DRX_AGCH_LOAD_AIR_DEN:       6832
AVE_NON_DRX_AGCH_LOAD_AIR_SUM:       4510
AVE_PAGING_GB_BUF_DEN:               6258
AVE_PAGING_GB_BUF_SUM:               3936
AVE_PAGING_LOAD_AIR_DEN:             6504
AVE_PAGING_LOAD_AIR_SUM:             4182
AVE_PCH_GB_LOAD_ON_CCCH_DEN:         6094
AVE_PCH_GB_LOAD_ON_CCCH_SUM:         3772
CS_PAGING_MSG_SENT:                  4756
MAX_PAGING_GB_BUF:                   50
PS_PAGING_MSG_SENT:                  4674

===============================================================================
=
=                    RESOURCE AVAILABILITY MEASUREMENT
=                    Measurement used: p_nbsc_res_avail
=
===============================================================================

AVE_ADD_GPRS_CH_HOLD_TIME_DEN:       36023
AVE_ADD_GPRS_CH_HOLD_TIME_SUM:       9648
AVE_GPRS_CHANNELS_DEN:               1189347
AVE_GPRS_CHANNELS_SUM:               8784
AVE_PERMANENT_GPRS_CH_DEN:           1189779
AVE_PERMANENT_GPRS_CH_SUM:           9216
PEAK_GPRS_CHANNELS:                  63
PEAK_PERMANENT_GPRS_CH:              66
```

Figure 150. Report 235: GPRS counters

19.10 Cell related SGSN counters (700)

```
===============================================================================
=
=                   CELL RELATED SGSN COUNTER STATISTICS
=
=                   Network:         PLMN
=                   Area:            All BTSs having GPRS traffic selected
=                   Period:          from 2001011800 to 2001011816
=
===============================================================================

This report gives the sum (or maximum in case of peak value counter) of all
counters. These figures can used for verifying the KPI formulas or
learnig about the basic counter level. Only those measurements are covered
that provide data on cell level.

Measurements used: p_sgsn_mobility_management, p_sgsn_session_management,
.                  p_sgsn_sms

===============================================================================


===============================================================================
```

```
=
=                   MOBILITY MANAGEMENT MEASUREMENT COUNTER STATISTICS
=
===============================================================================
=

SUCC_GPRS_ATTACH:                    117
FAIL_GPRS_ATTACH:                    8

SUCC_COMBINED_ATTACH:                36
FAIL_COMBINED_ATTACH:                14

SUCC_IMSI_ATTACH:                    0
FAIL_IMSI_ATTACH:                    0

GENERAL_UNDEF_ATTACH_FAILURE:        0

SUCC_INTRA_PAPU_RA_UPDAT:            1305
FAIL_INTRA_PAPU_RA_UPDAT:            551

SUCC_INTRA_PAPU_RA_LA_UPDAT:         4
FAIL_INTRA_PAPU_RA_LA_UPDAT:         0

SUCC_INTRA_PAPU_RA_UPDAT_IMSI:       1
FAIL_INTRA_PAPU_RA_UPDAT_IMSI:       0

SUCC_INTER_PAPU_RA_UPDAT:            0
FAIL_INTER_PAPU_RA_UPDAT:            0

SUCC_INTER_PAPU_RA_LA_UPDAT:         0
FAIL_INTER_PAPU_RA_LA_UPDAT:         0

SUCC_INTER_PAPU_RA_UPDAT_IMSI:       0
FAIL_INTER_PAPU_RA_UPDAT_IMSI:       0

SUCC_INTER_SGSN_RA_UPDAT:            0
FAIL_INTER_SGSN_RA_UPDAT:            1

SUCC_INTER_SGSN_RA_LA_UPDAT:         0
FAIL_INTER_SGSN_RA_LA_UPDAT:         0

SUCC_INTER_SGSN_RA_UPDAT_IMSI:       0
FAIL_INTER_SGSN_RA_UPDAT_IMSI:       0

SUCC_PERIODICAL_RA_UPDAT:            16
FAIL_PERIODICAL_RA_UPDAT:            0

SUCC_PERIODIC_RA_LA_UPDAT:           0
FAIL_PERIODIC_RA_LA_UPDAT:           0

SUCC_OUTG_INTER_PAPU_RA_UPDAT:       0
FAIL_OUTG_INTER_PAPU_RA_UPDAT:       0

SUCC_OUTG_INTER_SGSN_RA_UPDAT:       0
FAIL_OUTG_INTER_SGSN_RA_UPDAT:       0

GENERAL_UNDEF_RA_UPDAT_FAILURE:      0
SUCC_POWER_OFF_DETACH:               82

SUCC_MO_GPRS_DETACH:                 1
SUCC_MO_COMBINED_DETACH:             0
SUCC_MO_IMSI_DETACH:                 0

SUCC_NWR_GPRS_DETACH:                0
SUCC_NWR_COMBINED_DETACH:            0
SUCC_NWR_IMSI_DETACH:                0

SUCC_IMPL_GPRS_DETACH:               32
```

```
SUCC_IMPL_COMBINED_DETACH:           0

GENERAL_UNDEF_DETACH_FAILURES:       0

INCOMING_CELL_UPDAT:                 291
OUTGOING_CELL_UPDAT:                 934

===============================================================================
=
=                  SESSION MANAGEMENT MEASUREMENT COUNTER STATISTICS
=
===============================================================================
=

SUCC_MO_PDP_CONTEXT_ACT:             101
FAIL_MO_PDP_CONTEXT_ACT:             38

SUCC_NWR_PDP_CONTEXT_ACT:            0
FAIL_NWR_PDP_CONTEXT_ACT:            0

SUCC_MO_PDP_CONTEXT_DEACT:           46
FAIL_MO_PDP_CONTEXT_DEACT:           0

SUCC_NWR_PDP_CONTEXT_DEACT:          0
FAIL_NWR_PDP_CONTEXT_DEACT:          0

SUCC_PDP_CONT_MODIFY_SERVICES:       0
FAIL_PDP_CONT_MODIFY_SERVICES:       0

SUCC_PDP_CONTEXT_PARAM_CHANGES:      0
FAIL_PDP_CONT_PARAM_CHANGES:         0

SUCC_PDP_CONT_DEACT_SERVICES:        39
FAIL_PDP_CONT_DEACT_SERVICES:        0

SUCC_IMPL_PDP_CONTEXT_DEACT:         0
FAIL_IMPL_PDP_CONTEXT_DEACT:         0

===============================================================================
=
=                  SMS MEASUREMENT COUNTER STATISTICS
=
===============================================================================
=

SUCCESSFULLY_SENT_MO_SMS:
SUCCESSFULLY_RECEIVED_MT_SMS:

FAILED_MO_SMS_DELIVERIES:
FAILED_MT_SMS_DELIVERIES:
```

Figure 151. Report 700: Cell related SGSN counters

19.11 Find cells having GPRS enabled TRXs (051)

This report provides a list of GPRS BTS and their parameter settings.

```
===============================================================================
=
=                   BTS HAVING GPRS ENABLED TRXS
=
```

```
=                   Network:   PLMN
=                   Area:      BSC -   50264
=                   Period:    from 20030120 to 20030124
=                   Filter:    BTS having GPRS TRXs
=
===============================================================================

This report provides a list of GPRS BTSs and their parameter settings.

M                         Master BTS of the segment
Unl TRXs                  All TRX that are unlocked
GENA                      GPRS enabled
GPRS TRXs                 Number of GPRS enabled TRXs
Avail tsl                 Average available timeslots for GPRS and speech
.                         in normal TRXs ( ava_28 + ava_16a )
CDED (%)                  Dedicated GPRS capacity. Parameter setting.
PS dedic (%)    /trf_88b  Share of TCH (normal TRX) capacity dedicated for GPRS.
                          Note: counted over 3-4AM.
PS dedic (tsl)  /ava_17a  TCH (normal TRX) capacity dedicated for GRPS.
                          Note: counted over 3-4AM.
CDEF (%)                  Default GPRS capacity. Parameter setting.
PS territ (%)   /trf_87b  Share of TCH (normal TRX) capacity used as GPRS territory
.
                          Note: counted over 3-4AM.
PS territ (tsl) /ava_16a  TCH (normal TRX) capacity used as GPRS territory.
                          Note: counted over 3-4AM.
Addit.ch.seizures /ach_3  Number of additional channel seizures.
                          Note: counted over 3-4AM.
BFG                       Prefer BCCH TRXs in GPRS TCHs allocation
TRP                       TRX priority in channel allocation
Priority                  Defined based on the settings of BFG and TRP
GTUGT sec                 GPRS territory upgrade guard time (BSC parameter)
ALPHA                     POC parameter
GAMMA                     POC parameter
IFP                       Idle mode signal strength period. POC parameter
TFP                       Transfer mode signal strength period. POC parameter
AG                        Number of blocks for AGCH

Note: territory sizes are counted using hour 3-
4AM only in order to get default values
(low traffic -> smaller probability for downgrades or upgrades)

===============================================================================
```

BSC	BCF	BCF	Seg Id	Segment	BTS	BTS	M
BSC1KUTOJA	1	BSC1KUTOJA	1	KUTOJA000	1	KUTOJA000	M
BSC1KUTOJA	1	BSC1KUTOJA	2	KUTOJA120	2	KUTOJA120	M
BSC1KUTOJA	1	BSC1KUTOJA	3	KUTOJA240	3	KUTOJA240	M
BSC1KUTOJA	4	BSC1KUTOJA	6	SUOSAARI051	6	SUOSAARI051	M
BSC1KUTOJA	4	BSC1KUTOJA	7	SUOSAARI275	7	SUOSAARI275	M

CI	LAC	RAC	GENA	GPRS TRXs	Unl TRXs	Avail tsl	CDED (%)	PS dedic (%)	PS dedic (tsl)	CDEF (%)	PS territ (%)	Avail PS (tsl)
10001	1	11	Yes	2	2	15.0	40	40.0	6.0	40	40	6.0
10002	1	11	Yes	2	2	15.0	40	40.0	6.0	40	40	6.0
10003	1	11	Yes	2	0	0.0	40	0.0	0.0	40	0	0.0
10006	1	11	Yes	2	2	9.2	50	69.6	6.4	50	70	6.4
10007	1	11	Yes	2	2	14.0	50	50.0	7.0	50	50	7.0

Addit.ch seizures	BFG	TRP	Priority	GTUGT (sec)	ALPHA	GAMMA	IFP	TFP	AG

```
--------!---!----!-----------!-----!-----!-----!---!---!---
       0!no !   0!no priority!    2!  0.8! 36.0!  9! 13!  1
       0!no !   0!no priority!    2!  0.8! 36.0!  9! 13!  1
       0!no !   0!no priority!    2!  0.8! 36.0!  9! 13!  1
       0!no !   0!no priority!    2!  0.8! 34.0!  9! 13!  2
       0!yes!   0!no priority!    2!  0.8! 36.0!  9! 13!  2
```

Figure 152. Report 051: Find cells having GPRS enabled TRXs

19.12 Routing areas (103)

The **Routing areas** (103) report generates a list of routing areas and the number of BTSs in them.

```
                           BTS    BTS
       LAC         RAC    nus    usd
---------- ---------- ------ ------
         1          11      2     15
         1          71      0      6
         2          22      0      2
         2          72      1      5
         2         255     42      7
```

Figure 153. Report 103: Routing area

19.13 EGPRS Parameters (055)

```
================================================================================
=
=                   EGPRS PARAMETERS
=
=                   Network:   PLMN
=                   Area:      BSC -   50264
=
=
================================================================================
EGPRS link adaptation parameters:
EGPRS Enabled, Attribute enables or disables EGPRS on BTS level. All TRXs of
.              the BTS have to be EDGE capable.The GPRS must be enabled
.              in the segment in order to enable EGPRS in the BTS.

MSC Ack mode,  Indicates the Modulation and Coding Scheme (MCS)
.              at the beginning of a TBF for knowledgedack mode.

MSC Unack mode Indicates the MCS used at the beginning
.              of a TBF for unacknowledged mode.

Max Bler Ack   Indicates the maximum block error rate in unacknowledged mode.
.              The unit is parts per thousand.

Max Bler Unack Indicates the maximum block error rate in unacknowledged mode.
.              The unit is parts per thousand.
```

```
Beb gmsk       Adjusts MCS and modulation preferences.
.              This is the offset added to the reported GMSK mean BEP values
.              before BEP table look ups. The value applies to both uplink and
.              downlink directions.

Beb 8psk       Adjusts MCS and modulation preferences. This is the offset
.              added to the reported 8PSK mean BEP values before BEP table lockups.
.              The value applies to both uplink and downlink directions.

================================================================================

          !       !      !             !       !             !      !
          !    BSC!BCF   !             !   Seg.!             !BTS   !
BSC       ! INT_ID!id    !BCF          !     id!Segment      !id    !
----------!-------!------!-------------!-------!-------------!------!
BSC1KUTOJA!   3208!1     !BSC1KUTOJA   !      1!KUTOJA000    !1     !
BSC1KUTOJA!   3208!6     !BSC1KUTOJA   !     10!LAAJALAHTI270!10    !
BSC1KUTOJA!   3208!7     !BSC1KUTOJA   !     11!TELEKARA060  !11    !
BSC1KUTOJA!   3208!7     !BSC1KUTOJA   !     12!TELEKARA170  !12    !
BSC1KUTOJA!   3208!7     !BSC1KUTOJA   !     13!TELEKARA300  !13    !


              !       !          !
              !    BTS!EGPRS     !
BTS           ! INT_ID!Enabled   !
--------------!-------!----------!
KUTOJA000     !   3620!Disabled  !
LAAJALAHTI270 !   3398!Disabled  !
TELEKARA060   !   3408!Disabled  !
TELEKARA170   !   3409!Disabled  !
TELEKARA300   !   3410!Disabled  !


       MSC!       MSC!       Max!       Max!          !
       Ack!     Unack!      Bler!      Bler!       Beb!       Bep
      mode!      mode!      Ack !    Unack !      gmsk!      8psk
----------!----------!----------!----------!----------!----------
         9!         6!        90!        10!         0!         0
         9!         6!        90!        10!         0!         0
         9!         6!        90!        10!         0!         0
         9!         6!        90!        10!         0!         0
         9!         6!        90!        10!         0!         0
```

Figure 154. Report 055: EGPRS Parameters

19.14 PBCCH availability (255)

```
===============================================================================
=
=              PBCCH AVAILABILITY PI
=
=              Network:            test-plmn
=              Area:               All BTSs selected
=              Period:             from 20020922 to 20021120
=              Hours selection:    all hours counted
=              Time aggregation:   whole period
=              Object aggregation: BTS
=
===============================================================================

This report shows statistics for PBCCH availability.
```

```
You can choose the time (total,day,hour) and object aggregation level
(BTS,BSC,whole area,MR).


Performance Indicators used in this report:

c91000    Number of PRACH slots
c91003    Number of Busy PRACH
c91002    Number of Packet channel requests

Paging requests (DRX):
c91017    Number of discarded paging packets due to shortage of DRX buffer
c91018    Number of CS paging requests sent on the PCCCH
c91019    Number of PS paging requests sent on the PCCCH
c91020    Number of Packet Paging Request messages sent on the PCCCH

Assignment messages:
c91021    Number of Packet UL Assignment messages sent on the PCCCH
c91022    Number of non-DRX mode Packet DL Assignment messages sent on the PCCCH
c91023    Number of DRX mode Packet DL Assignment messages sent on the PCCCH

Immediate assignment messages (CCCH):
c91025    Number of Packet Immediate Assignment messages sent due to UL TBF
c91026    Number of Packet Immediate Assignment messages sent due to DL TBF
.         and addressed to a DRX mode MS
c91027    Number of Packet Immediate Assignment messages sent due to DL TBF
.         and addressed to a non-DRX mode MS

Non-DRX PPCH buffered messages:
c91004         Maximum number of buffered messages in a PPCH queue
c91005/c91006  Average number of buffered messages in a PPCH queue

PAGCH buffered messages:
c91007         Maximum number of buffered messages in a PAGCH queue
c91008/c91009  Average number of buffered messages in a PAGCH queue

DRX buffer maximum occupancy:
c91010         Maximum number of buffered DRX messages in a DRX array
c91011/c91012  Average number of buffered DRX messages in a DRX array

Deleted messages:
c91013    Number of DRX messages discarded due to shortage of DRX buffer space
c91015    Number of messages discarded due to shortage of PAGCH queue space
c91014    Number of non-DRX messages discarded due to shortage of PPCH queue space
c91016    Number of DRX messages discarded due to shortage of DRX buffer space

c91024    Number of Packet Access Reject messages sent on the PCCCH


Measurements associated: p_nbsc_pbcch_avail
Note: The measurement generates statistics only for those BTSs that have
PBCCH events.

===============================================================================
              !     !              !   !               !    !       !       !
              !     !              !   !               !    !       !       !
              !     !              !   !               !    !       !       !
              !     !              !   !               !    !  PRACH!       !
              !BSC  !              !BCF!               ! BTS!  slots!  RACHs!
BSC           !id   !BCF           ! id!BTS            !  id! c91000! c91003!
--------------!-----!--------------!---!---------------!----!-------!-------!
CARMEN        !85964!CARMEN        !10 !MANSELL1       !  11!      0!      9!
CARMEN        !85964!CARMEN        !10 !MANSELL2       !  12!      0!      9!
CARMEN        !85964!CARMEN        !10 !MANSELL3       !  13!      0!      9!
CARMEN        !85964!CARMEN        !20 !PROST1         !  21!      0!      9!
CARMEN        !85964!CARMEN        !20 !PROST2         !  22!      0!      9!
```

```
       !        !       !         !        !       !         !        !
       !        !       !         !        !       !         !        !
       !    ****! Paging!reqs(DRX)!****    !   ****!**Assign.!msgs.** !
   P-ch!********!*******!*********!********!*******!*********!********!
   reqs! deleted!     CS!       PS! PP msgs!     UL!nonDRX DL!  DRX DL!
 c91002!  c91017! c91018!   c91019!  c91020! c91021!   c91022!  c91023!
-------!--------!-------!---------!--------!-------!---------!--------!
      6!      51!     54!       57!      60!     63!       66!      69!
      6!      51!     54!       57!      60!     63!       66!      69!
      6!      51!     54!       57!      60!     63!       66!      69!
      6!      51!     54!       57!      60!     63!       66!      69!
      6!      51!     54!       57!      60!     63!       66!      69!


         !       !        ! **nonDRX!PPCH**  !        !          !
  ***Imm.!Assign.!msg***  ! buffered!msgs     !  *PAGCH!buffer*   !
*********!*******!********!*********!*********!********!**********!
   UL TBF! DL TBF!  DL TBF!      max!      ave!max msgs!  ave msgs!
         !    DRX!  nonDRX!         !  c91005/!        !   c91008/!
   c91025! c91026! c91027!   c91004!   c91006!  c91007!    c91009!
---------!-------!--------!---------!---------!--------!----------!
       75!     78!      81!       12!     0.83!      21!      0.89!
       75!     78!      81!       12!     0.83!      21!      0.89!
       75!     78!      81!       12!     0.83!      21!      0.89!
       75!     78!      81!       12!     0.83!      21!      0.89!
       75!     78!      81!       12!     0.83!      21!      0.89!


  **DRX!buffer** !       !       !       !       !
    max!occupancy!   ****!Deleted! msgs**!****   !
*******!*********!*******!*******!*******!*******! Access
    max!      ave!    DRX!       ! nonDRX! DRX DL!   rej.
       !  c91011/!   PPCH!  PAGCH!   PPCH! assign!   msg.
 c91010!   c91012! c91013! c91015! c91014! c91016! c91024
-------!---------!-------!-------!-------!-------!-------
     30!     0.92!     39!     45!     42!     48!     72
     30!     0.92!     39!     45!     42!     48!     72
     30!     0.92!     39!     45!     42!     48!     72
     30!     0.92!     39!     45!     42!     48!     72
     30!     0.92!     39!     45!     42!     48!     72
```

Figure 155. Report 255: PBCCH availability

20 Adaptive multirate

20.1 Distribution of call samples by codecs and quality classes (BER) (244)

```
===============================================================================
=
=              DISTRIBUTION OF CALL SAMPLES BY CODECS AND QUALITY CLASSES (BER)
=
=              Network:            PLMN
=              Area:               All BTSs selected
=              Period:             from 20020514 to 20020514
=              Hours selection:    all hours counted
=              Time aggregation:   whole period
=              Object aggregation: whole area
=
===============================================================================

This report shows the call sample distribution for AMR and nonAMR modes.
You can choose Time (total, day, hour) and object aggregation level
(TRX, BTS, BSC, whole area, MR). On BTS summary level the list is sorted by
the number of call samples, otherwise by object names and time.

TRX type indicates if there are extended or normal TRXs or a mixture of them.

.                            **********************
.                            Background information
.                               Quality classes
.                            Background information
.                               Quality classes
.                            **********************

The quality classes are as defined in GSM recommendation GSM 05.08 (8.2).
The calls are sampled every 480 ms for the quality class. Quality class info is
used on Abis but BSC converts the quality classes into BER % figures
using the default values. (Power control measurement shows BER figures).

Class BER (GSM 05.08)
***** *****************
qua 0 (BER < 0.2%)
qua 1 (BER 0.2 - 0.4%)
qua 2 (BER 0.4 - 0.8%)
qua 3 (BER 0.8 - 1.6%)
qua 4 (BER 1.6 - 3.2%)
qua 5 (BER 3.2 - 6.4%)
qua 6 (BER 6.4 - 12.8%)
qua 7 (BER >12.8%)

The rule of thumb is that in quality classes 0-5 the MS user does not yet feel
that the quality is bad.
```

```
Measurements associated: p_nbsc_rx_qual

Note: Rx Quality measurement generates data only for those TRXs where there is
TCH voice traffic, i.e. TRXs without voice calls are not visible in this report.

===============================================================================

PART 1
Distribution of call samples by codecs and quality classes

       !Call      !     !      !      !      !      !      !      !      !      !
       !samples   !     !      !      !      !      !      !      !      !      !
       !****      !     !  ***!******!******!  UL  !******!******!******!***    !
TRX    !nonAMR    !     ! q0  !  q1  !  q2  !  q3  !  q4  !  q5  !  q6  !  q7  !
type   !AMR       !     ! (%) !  (%) !  (%) !  (%) !  (%) !  (%) !  (%) !  (%) !
-------!----------!-----!------!------!------!------!------!------!------!------!
normal !    479279!NoAMR!  98.4!   0.3!   0.5!   0.3!   0.2!   0.1!   0.0!   0.3!
       !         2!FR M1!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!
       !          !FR M2!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!
       !          !FR M3!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!
       !          !FR M4!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!
       !          !HR M1!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!
       !          !HR M2!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!
       !          !HR M3!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!
       !          !HR M4!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!

     !      !      !      !      !      !      !      !
     !      !      !      !      !      !      !      !
     !   ***!******!******!  DL  !******!******!******!***
     !  q0  !  q1  !  q2  !  q3  !  q4  !  q5  !  q6  !  q7
     !  (%) !  (%) !  (%) !  (%) !  (%) !  (%) !  (%) !  (%)
-----!------!------!------!------!------!------!------!------
NoAMR!  98.0!   0.5!   0.5!   0.3!   0.2!   0.2!   0.1!   0.1
FR M1!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0
FR M2!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0
FR M3!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0
FR M4!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0
HR M1!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0
HR M2!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0
HR M3!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0
HR M4!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0!   0.0

PART 2

Bitrates (kbps) and occurrences for each codec set used in the BTS area
during given time period.
Note: the occurrences are counted among those records that have AMR data.

Bitrates in FR codec set     !Bitrates in HR codec set        !

(M4,M3,M2,M1)                !(M4,M3,M2,M1)                   !NBR_OF_RCDS
-----------------------------!--------------------------------!-----------
                             !                                !          4
                             !4.74                            !          4
                             !5.15                            !          2
                             !5.15 4.74                       !          1
                             !7.50 5.90 4.74                  !          1
```

Figure 156. Report 244: Distribution of call samples by codecs and quality classes, S10 (BER)

20.2 Distribution of call samples by codecs and quality classes (FER) (245)

```
===============================================================================
=
=              DISTRIBUTION OF CALL SAMPLES BY CODECS AND QUALITY CLASSES (FER)
=              DYNAMIC TIME AND OBJECT AGGREGATION
=
=              Network:            PLMN
=              Area:               All BTSs selected
=              Period:             from 20020512 to 20020514
=              Hours selection:    all hours counted
=              Time aggregation:   whole period
=
===============================================================================

This report shows call sample distribution over all used codec types
and FER classes.
You can choose Time (total, day, hour) and object aggregation level
(TRX, BTS, BSC, whole area, MR, TRX).

TRX type             cnf_2                 Indicates if there are normal or both
                                           normal and extended TRXs.
Codec                c77002                Type of codec
UL samples           c77015+..+c77022      Total nbr of UL samples per codec type.
UL class 0..7 %      ulq_3                 Percentage of UL samples per class and
                                           codec type (matrix)
DL samples           c77023+..+c77030      Total nbr of DL samples per codec type.
DL class 0..7 %      dlq_3                 Percentage of DL samples per class and
                                           codec type (matrix)
DL samples estim %                         Share of estimated samples (c77031) out
                                           of total nbr of DL samples
.                                          In S10 all DL samples are estimated (FEP).

For styling the report there are two options: with or without indentation.
Indentation makes the report easier to read but difficult to export.

Measurements associated: p_nbsc_fer

Note: FER measurement generates data only for those TRXs where there is TCH
voice traffic, i.e. TRXs without voice calls are not visible in this report.

Warning: In order to avoid too large reports, do not use object level 'TRX'
together with time level 'hour' if you have selected a large BTS area.

===============================================================================
PART 1
Distribution of call samples by codecs and quality classes (ulq_3,dlq_3)

              !          !                        !   !                     !
              !          !                        !   !                     !
              !          !                        !BCF!                     !
BSC           !BSC_ID    !BCF                     !id !BTS                  !
--------------!----------!------------------------!---!---------------------!
BSC1KUTOJA    !50264     !GSM800BOCHUM            !53 !850BOCHUM53          !

                         !KUTOJA001               !1  !KUTOJA000            !

                         !                        !9  !SATERI270            !

                                                      !SATERI280            !

                                                  !12 !TKARACOSITZZZ        !
```

```
    !       !           !
    !       !           !
 BTS!TRX    !           !
  id!type   !CODEC      !
----!-------!-----------!
  53!normal !EFR        !
            !AMR FR 12.2!
            !AMR FR 5.9 !
            !AMR FR 7.5 !
            !AMR FR 4.75!
            !unknown    !

   1!normal !EFR        !

  28!normal !EFR        !

  29!normal !EFR        !

  41!normal !EFR        !
```

```
          !       !       !       !       !       !       !       !       !
          !    ***! ******! ******!   UL  ! ******! ******! ******! ***   !
        UL!class 0!class 1!class 2!class 3!class 4!class 5!class 6!class 7!
   samples!    (%)!    (%)!    (%)!    (%)!    (%)!    (%)!    (%)!    (%)!
----------!-------!-------!-------!-------!-------!-------!-------!-------!
      4615!  95.31!   0.00!   0.00!   0.00!   0.04!   0.00!   0.04!   0.35!
        18!   0.37!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!
        18!   0.37!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!
        18!   0.37!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!
        18!   0.37!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!
       133!   2.76!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!

        72!  97.22!   0.00!   1.39!   0.00!   1.39!   0.00!   0.00!   0.00!

       116! 100.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!

      2313!  99.96!   0.00!   0.00!   0.00!   0.04!   0.00!   0.00!   0.00!

       344! 100.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!
```

```
          !       !       !       !       !       !       !       !       !DL
          !    ***! ******! ******!   DL  ! ******! ******! ******! ***   !sample
        DL!class 0!class 1!class 2!class 3!class 4!class 5!class 6!class 7!estim
   samples!    (%)!    (%)!    (%)!    (%)!    (%)!    (%)!    (%)!    (%)!(%)
----------!-------!-------!-------!-------!-------!-------!-------!-------!------
         0!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00! na
         0!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00! na
         0!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00! na
         0!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00! na
         0!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00! na
         0!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00! na

         0!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00! na

         0!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00! na

         0!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00! na

         0!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00!   0.00! na
```

```
Note: DL sampling needs some time to collect enough data for making the
correlations. Therefore the counters may show 0 first.

PART 2
```

```
Boundaries used in the selected area for defining the classes.
    !    !    !    !    !    !    !    !    ! Ave!
B0  !B1  !B2  !B3  !B4  !B5  !B6  !B7  !B8  ! win!
(%) !(%) !(%) !(%) !(%) !(%) !(%) !(%) !(%) !size!OCCURENCES
----!----!----!----!----!----!----!----!----!----!----------
   0 ! 2.0! 4.0! 6.0! 8.0!10.0!12.0!14.0! 100!   2!        31

The class boundaries B1..B7 (FER %) and averaging window size (SACCH frames)
are defined in the measurement setup.  B0 and B8 are fixed.
Class0 is between boundary 0 (B0) and boundary 1 (B1) etc.
The Occurrences column shows the number of records where the setting is met.
If there are more than one line, then different settings are used in the area.
```

Figure 157. Report 245: Distribution of call samples by codecs and quality classes ,S10 (FER)

20.3 AMR call time and quality, dynamic time and object aggregation (246)

```
===============================================================================
=
=              AMR CALL TIME AND QUALITY, DYNAMIC TIME AND OBJECT AGGREGATION
=
=              Network:            PLMN
=              Area:               All BTSs selected
=              Period:             from 20020529 to 20020529
=              Hours selection:    all hours counted
=              Time aggregation:   whole period
=              Object aggregation: BTS
=              Filter:             traffic,
=
===============================================================================

This report shows the PIs and KPIs for checking
- interference
- call time: non-AMR, FR AMR, FR AMR  (see report 244 for more details)
- BER based quality KPIs (see report 244 for more details)
- FER (UL) and FEP (DL) based quality KPIs (see report 245 for more details)

Time and object aggregation level can be chosen.
On the BTS summary level the list is sorted by traffic (number of UL call
samples), otherwise by object names and time.

TRX type indicates if there are extended TRXs or just normal TRXs.


Measurements associated:
p_nbsc_power, p_nbsc_rx_qual, p_nbs_fer (TRX level measurements)
Note that p_nbsc_rx_power is used as base for joining.

Note: Time aggregation 'measurement period' works correctly only if all
measurements are set up with the same measurement period.

===============================================================================

              !     !                        !   !                       !    !
              !     !                        !   !                       !    !
              !     !                        !   !                       !    !
              !BSC  !                        !BCF!                       ! BTS!
BSC           !id   !BCF                     ! id!BTS                    !  id!
```

```
--------------!-----!------------------------!---!--------------------!----!
BSC2SAPO      !50265!ULTRA-52                !52 !BOCHUM57            !  57!
BSC2SAPO      !50265!ULTRA-52                !52 !BOCHUM55            !  55!
BSC2SAPO      !50265!ULTRA-52                !52 !BOCHUM60            !  60!
BSC4TRE       !85249!EGSM_3Ail               !12 !34HERMIA3AIVHUO     !  34!
BSC4TRE       !85249!AlmareGSM               !13 !ALMARE39            !  39!


       !     !           !  ====!=Call=!====  !   ===!UL Qua!q0_5==!====  !
       !UL   !           !  ====!=time=!====  !   1==!===2==!===3==!===4  !
       !Intrf!       Call!  1===!===2==!===3  !total !nonAMR!AMR FR!AMR HR!
TRX    !level!       time!NonAMR!FR AMR!HR AMR!(%)   !(%)   !(%)   !(%)   !
type   !itf_4!       (hr)!(%)   !(%)   !(%)   !ulq_6 !ulq_2 !ulq_5 !ulq_4 !
-------!-----!-----------!------!------!------!------!------!------!------!
normal !  3.0!      11.78! 100.0!   0.0!   0.0!  99.9!  99.9!----- !----- !
normal !  1.1!       7.82! 100.0!   0.0!   0.0!  99.8!  99.9!----- !----- !
normal !  1.0!       6.03! 100.0!   0.0!   0.0!  99.8!  99.9!----- !----- !
normal !  1.0!       0.85! 100.0!   0.0!   0.0! 100.0! 100.0!----- !----- !
normal !  1.0!       0.79! 100.0!   0.0!   0.0! 100.0! 100.0!----- !----- !


   ===!DL Qua!q0_5==!====  !  ====!======!UL FER!q0..5=!====  !  ====!
   1==!===2==!===3==!===4  !  1===!==2===!==3===!==4===!===5  !  1===!
total !nonAMR!AMR FR!AMR HR!HR    !FR    !EFR   !AMR HR!AMR FR!HR    !
(%)   !(%)   !(%)   !(%)   !(%)   !(%)   !(%)   !(%)   !(%)   !(%)   !
dlq_6 !dlq_2 !dlq_5 !dlq_4 !ulq_7 !ulq_8 !ulq_9 !ulq_10!ulq_11!dlq_7 !
------!------!------!------!------!------!------!------!------!------!
  99.8!  99.9!----- !----- !----- !----- !----- !----- !----- !----- !
 100.0! 100.0!----- !----- !----- !----- !----- !----- !----- !----- !
  98.6!  99.3!----- !----- !----- !----- !----- !----- !----- !----- !
  99.9! 100.0!----- !----- !----- !----- !----- !----- !----- !----- !
 100.0! 100.0!----- !----- !----- !----- !----- !----- !----- !----- !


======!DL FER!q0..5=!====
==2===!==3===!==4===!===5
FR    !EFR   !AMR HR!AMR FR
(%)   !(%)   !(%)   !(%)
dlq_8 !dlq_9 !dlq_10!dlq_11
------!------!------!------
----- !----- !----- !-----
----- !----- !----- !-----
----- !----- !----- !-----
----- !----- !----- !-----
----- !----- !----- !-----
```

Figure 158. Report 246: AMR call time and quality, dynamic time and object aggregation

20.4 Transcoder failure ratio (247)

```
================================================================================
=
=              TRANSCODER FAILURE RATES
=
=              Network:            PLMN
=              Area:               All BTSs selected
=              Period:             from 20020526 to 20020528
=              Hours selection:    all hours counted
```

```
=              Time aggregation:   whole period
=              Object aggregation: BTS
=              Filter:             seizures,
=
===============================================================================

This report shows seizure and failure statistics for different speech codecs.

You can choose the time and object aggregation level.
On the BTS summary level the list is sorted by the number of seizures,
otherwise by object names and time.

Measurements associated: p_nbsc_traffic

===============================================================================
              !     !                        !   !                        !    !
              !BSC  !                        !BCF!                        ! BTS!
BSC           !id   !BCF                     ! id!BTS                     !  id!
--------------!-----!------------------------!---!------------------------!----!
BSC2SAPO      !50265!ULTRA-52                !52 !BOCHUM55                !  55!
BSC2SAPO      !50265!ULTRA-52                !52 !BOCHUM57                !  57!
BSC2SAPO      !50265!ULTRA-52                !52 !BOCHUM59                !  59!
BSC2SAPO      !50265!ULTRA-52                !52 !BOCHUM60                !  60!
BSC2SAPO      !50265!ULTRA-52                !52 !BOCHUM62                !  62!


  ========!==========!=Seizures=!==========!========  !  =====!=======!
       FR!       EFR!        HR!    AMR FR!    AMR HR!FR     !EFR    !
     c1008!     c1009!     c1111!     c1110!     c1113!dcr_16 !dcr_17 !
----------!----------!----------!----------!----------!-------!-------!
         0!      5250!         0!         0!         0! ----- !   0.0 !
         0!      4467!         0!         0!         0! ----- !   0.0 !
         0!      2014!         0!         0!         0! ----- !   0.0 !
         0!      1857!         0!         0!         0! ----- !   0.1 !
         0!      1052!         0!         0!         0! ----- !   0.0 !


Fail % !=======!=====
HR     !AMR FR !AMR HR
dcr_18 !dcr_19 !dcr_20
-------!-------!------
 ----- ! ----- ! -----
 ----- ! ----- ! -----
 ----- ! ----- ! -----
 ----- ! ----- ! -----
 ----- ! ----- ! -----
```

Figure 159. Report 247: Transcoder failure ratio

20.5 Codec set modification failure ratio (248)

```
===============================================================================
=
=              CODEC SET MODIFICATION FAILURE RATIO
=
=              Network:            PLMN
=              Area:               All BTSs selected
=              Period:             from 20020530 to 20020530
=              Hours selection:    all hours counted
=              Time aggregation:   whole period
=              Object aggregation: BTS
=              Filter:
```

```
=
===============================================================================

This report shows seizure and failure statistics for codec set modifications.

You can choose the time and object aggregation level.
On BTS summary level the list is sorted by the sum of upgrade and downgrade
attempts, otherwise by object names and time.

Measurements associated: p_nbsc_traffic

===============================================================================
              !     !                        !   !                   !    !
              !     !                        !   !                   !    !
              !BSC  !                        !BCF!                   ! BTS!
BSC           !id   !BCF                     ! id!BTS                !  id!
--------------!-----!------------------------!---!-------------------!----!
BSC1KUTOJA    !50264!KUTOJA001               !1  !KUTOJA000          !   1!
BSC1KUTOJA    !50264!KUTOJA001               !1  !KUTOJA120          !   2!
BSC1KUTOJA    !50264!SUOSAA004               !4  !SUOSAA1006         !   6!
BSC1KUTOJA    !50264!SUOSAA004               !4  !SUOSAA1007         !   7!


          !          !Downgra!Upgarde
 Downgrade!   Upgrade!fail   !fail
  attempts!  attempts!(%)    !(%)
     amr_2!     amr_1!amr_4  !amr_3
----------!----------!-------!-------
         0!         0! ----- ! -----
         0!         0! ----- ! -----
         0!         0! ----- ! -----
         0!         0! ----- ! -----
```

Figure 160. Report 248: Codec set modification failure ratio

20.6 AMR counters summary (249)

```
===============================================================================
=
=                   AMR COUNTERS SUMMARY
=
=                   Network:         PLMN
=                   Area:            BSC -   85249
=                   Period:          from 2002061200 to 2002061214
=
===============================================================================

This report gives the sum of all AMR related counters.
These figures can be used for verifying the KPI formulas or
learning about the basic counter level.
If you need hourly counter values for a cell, use report 213.

Measurement used: p_nbsc_traffic, p_nbsc_rx_quality

===============================================================================


TCH_CALL_REQ_FOR_AMR:
FULL_TCH_SEIZ_INTRA_AMR_HO:
HALF_TCH_SEIZ_INTRA_AMR_HO:
```

```
SUCC_AMR_CODEC_SET_DOWNGR:
UNSUCC_AMR_CODEC_SET_DOWNGR:
SUCC_AMR_CODEC_SET_UPGR:
UNSUCC_AMR_CODEC_SET_UPGR:


HO_ATT_FOR_AMR_TO_FR:
HO_ATT_FOR_AMR_TO_HR:

AMR call samples:
*****************

AMR_FR_MODE_1_UL_RXQUAL_0:
AMR_FR_MODE_1_UL_RXQUAL_1:
AMR_FR_MODE_1_UL_RXQUAL_2:
AMR_FR_MODE_1_UL_RXQUAL_3:
AMR_FR_MODE_1_UL_RXQUAL_4:
AMR_FR_MODE_1_UL_RXQUAL_5:
AMR_FR_MODE_1_UL_RXQUAL_6:
AMR_FR_MODE_1_UL_RXQUAL_7:
AMR_FR_MODE_2_UL_RXQUAL_0:
AMR_FR_MODE_2_UL_RXQUAL_1:
AMR_FR_MODE_2_UL_RXQUAL_2:
AMR_FR_MODE_2_UL_RXQUAL_3:
AMR_FR_MODE_2_UL_RXQUAL_4:
AMR_FR_MODE_2_UL_RXQUAL_5:
AMR_FR_MODE_2_UL_RXQUAL_6:
AMR_FR_MODE_2_UL_RXQUAL_7:
AMR_FR_MODE_3_UL_RXQUAL_0:
AMR_FR_MODE_3_UL_RXQUAL_1:
AMR_FR_MODE_3_UL_RXQUAL_2:
AMR_FR_MODE_3_UL_RXQUAL_3:
AMR_FR_MODE_3_UL_RXQUAL_4:
AMR_FR_MODE_3_UL_RXQUAL_5:
AMR_FR_MODE_3_UL_RXQUAL_6:
AMR_FR_MODE_3_UL_RXQUAL_7:
AMR_FR_MODE_4_UL_RXQUAL_0:
AMR_FR_MODE_4_UL_RXQUAL_1:
AMR_FR_MODE_4_UL_RXQUAL_2:
AMR_FR_MODE_4_UL_RXQUAL_3:
AMR_FR_MODE_4_UL_RXQUAL_4:
AMR_FR_MODE_4_UL_RXQUAL_5:
AMR_FR_MODE_4_UL_RXQUAL_6:
AMR_FR_MODE_4_UL_RXQUAL_7:


AMR_HR_MODE_1_UL_RXQUAL_0:
AMR_HR_MODE_1_UL_RXQUAL_1:
AMR_HR_MODE_1_UL_RXQUAL_2:
AMR_HR_MODE_1_UL_RXQUAL_3:
AMR_HR_MODE_1_UL_RXQUAL_4:
AMR_HR_MODE_1_UL_RXQUAL_5:
AMR_HR_MODE_1_UL_RXQUAL_6:
AMR_HR_MODE_1_UL_RXQUAL_7:
AMR_HR_MODE_2_UL_RXQUAL_0:
AMR_HR_MODE_2_UL_RXQUAL_1:
AMR_HR_MODE_2_UL_RXQUAL_2:
AMR_HR_MODE_2_UL_RXQUAL_3:
AMR_HR_MODE_2_UL_RXQUAL_4:
AMR_HR_MODE_2_UL_RXQUAL_5:
AMR_HR_MODE_2_UL_RXQUAL_6:
AMR_HR_MODE_2_UL_RXQUAL_7:
AMR_HR_MODE_3_UL_RXQUAL_0:
AMR_HR_MODE_3_UL_RXQUAL_1:
AMR_HR_MODE_3_UL_RXQUAL_2:
AMR_HR_MODE_3_UL_RXQUAL_3:
AMR_HR_MODE_3_UL_RXQUAL_4:
AMR_HR_MODE_3_UL_RXQUAL_5:
```

```
AMR_HR_MODE_3_UL_RXQUAL_6:
AMR_HR_MODE_3_UL_RXQUAL_7:
AMR_HR_MODE_4_UL_RXQUAL_0:
AMR_HR_MODE_4_UL_RXQUAL_1:
AMR_HR_MODE_4_UL_RXQUAL_2:
AMR_HR_MODE_4_UL_RXQUAL_3:
AMR_HR_MODE_4_UL_RXQUAL_4:
AMR_HR_MODE_4_UL_RXQUAL_5:
AMR_HR_MODE_4_UL_RXQUAL_6:
AMR_HR_MODE_4_UL_RXQUAL_7:

AMR_FR_MODE_1_DL_RXQUAL_0:
AMR_FR_MODE_1_DL_RXQUAL_1:
AMR_FR_MODE_1_DL_RXQUAL_2:
AMR_FR_MODE_1_DL_RXQUAL_3:
AMR_FR_MODE_1_DL_RXQUAL_4:
AMR_FR_MODE_1_DL_RXQUAL_5:
AMR_FR_MODE_1_DL_RXQUAL_6:
AMR_FR_MODE_1_DL_RXQUAL_7:
AMR_FR_MODE_2_DL_RXQUAL_0:
AMR_FR_MODE_2_DL_RXQUAL_1:
AMR_FR_MODE_2_DL_RXQUAL_2:
AMR_FR_MODE_2_DL_RXQUAL_3:
AMR_FR_MODE_2_DL_RXQUAL_4:
AMR_FR_MODE_2_DL_RXQUAL_5:
AMR_FR_MODE_2_DL_RXQUAL_6:
AMR_FR_MODE_2_DL_RXQUAL_7:
AMR_FR_MODE_3_DL_RXQUAL_0:
AMR_FR_MODE_3_DL_RXQUAL_1:
AMR_FR_MODE_3_DL_RXQUAL_2:
AMR_FR_MODE_3_DL_RXQUAL_3:
AMR_FR_MODE_3_DL_RXQUAL_4:
AMR_FR_MODE_3_DL_RXQUAL_5:
AMR_FR_MODE_3_DL_RXQUAL_6:
AMR_FR_MODE_3_DL_RXQUAL_7:
AMR_FR_MODE_4_DL_RXQUAL_0:
AMR_FR_MODE_4_DL_RXQUAL_1:
AMR_FR_MODE_4_DL_RXQUAL_2:
AMR_FR_MODE_4_DL_RXQUAL_3:
AMR_FR_MODE_4_DL_RXQUAL_4:
AMR_FR_MODE_4_DL_RXQUAL_5:
AMR_FR_MODE_4_DL_RXQUAL_6:
AMR_FR_MODE_4_DL_RXQUAL_7:

AMR_HR_MODE_1_DL_RXQUAL_0:
AMR_HR_MODE_1_DL_RXQUAL_1:
AMR_HR_MODE_1_DL_RXQUAL_2:
AMR_HR_MODE_1_DL_RXQUAL_3:
AMR_HR_MODE_1_DL_RXQUAL_4:
AMR_HR_MODE_1_DL_RXQUAL_5:
AMR_HR_MODE_1_DL_RXQUAL_6:
AMR_HR_MODE_1_DL_RXQUAL_7:
AMR_HR_MODE_2_DL_RXQUAL_0:
AMR_HR_MODE_2_DL_RXQUAL_1:
AMR_HR_MODE_2_DL_RXQUAL_2:
AMR_HR_MODE_2_DL_RXQUAL_3:
AMR_HR_MODE_2_DL_RXQUAL_4:
```

Figure 161. Report 249: AMR counters summary

20.7 AMR parameters (053)

```
===============================================================================
=
=                   AMR PARAMETERS
=
=                   Network:   PLMN
=                   Area:      BSC -   50264
=
===============================================================================

FR Mode Set .................. AMR Configuration Full Rate Codec Mode Set.
FR Conf hyst1 ................... AMR Configuration Full Rate Hysteresis 1.
FR Conf hyst2 ................... AMR Configuration Full Rate Hysteresis 2.
FR Conf hyst3  .................. AMR Configuration Full Rate Hysteresis 3.
FR Init Mode ................ AMR Configuration Full Rate Init Codec Mode.
FR Start Mode...................... AMR Configuration Full Rate Start Mode.
FR thr1 dB....................... AMR Configuration Full Rate Threshold 1.
FR thr2 dB....................... AMR Configuration Full Rate Threshold 2.
FR thr3 dB....................... AMR Configuration Full Rate Threshold 3.
HR Init Mode.. Defines AMR codec mode set defined parameters for Half Rate.
HR Conf hyst1....................... Defines AMR hysteresis 1 for Half Rate.
HR Conf hyst2....................... Defines AMR hysteresis 2 for Half Rate.
HR Conf hyst3....................... Defines AMR hysteresis 3 for Half Rate.
HR Init Mode... Defines AMR codec mode set defined parameters for Half Rate.
HR Start Mode.. Defines AMR start mode set defined parameters for Half Rate.
HR thr1 dB.......................... Defines AMR threshold 1 for Half Rate.
HR thr2 dB.......................... Defines AMR threshold 2 for Half Rate.
HR thr3 dB.......................... Defines AMR threshold 3 for Half Rate.
FR Ho Intra rxQua.... AMR Handover Intra Threshold Dl Rx Qual for Full Rate.
FR Ho Bad CI Ratio............ AMR handover Bad CI parameter for Full Rate.
FR Ho Good CI Ratio.......... AMR handover Good CI parameter for Full Rate.
FR Ho Thr dl RxQualAmr.................. Handover Dl Rx Qual for Full Rate.
FR Ho Thr ul RxQua......... AMR Handover Threshold Ul Rx Qual for Full Rate.
HR Ho Intra rxQua.... AMR Handover Intra Threshold Dl Rx Qual for Half Rate.
HR Ho Bad CI Ratio............ AMR handover Bad CI parameter for Half Rate.
HR Ho Good CI Ratio.......... AMR handover good CI parameter for Half Rate.
HR Ho Thr dl RxQual........ AMR Handover Threshold Dl Rx Qual for Half Rate.
HR Ho Thr ul RxQual........ AMR Handover Threshold Ul Rx Qual for Half Rate.
FR PoC LoThr dl qua..... Defines AMR Power Control Parameters for Full Rate.
FR PoC LoThr ul qua..... Defines AMR Power Control Parameters for Full Rate.
FR PoC UpThr dl qua..... Defines AMR Power Control Parameters for Full Rate.
FR PoC UpThr ul qua..... Defines AMR Power Control Parameters for Full Rate.
HR PoC LoThr dl qua..... Defines AMR Power Control Parameters for Half Rate.
HR PoC LoThr ul qua..... Defines AMR Power Control Parameters for Half Rate.
HR PoC UpThr dl qua..... Defines AMR Power Control Parameters for Half Rate.
HR PoC UpThr ul qua..... Defines AMR Power Control Parameters for Half Rate.

===============================================================================

          !       !      !             !       !             !      !
          !    BSC!BCF   !             !   Seg.!             !BTS   !
BSC       ! INT_ID!id    !BCF          !     id!Segment      !id    !
----------!-------!------!-------------!-------!-------------!------!
BSC1KUTOJA!   3208!1     !BSC1KUTOJA   !      1!KUTOJA000    !1     !
BSC1KUTOJA!   3208!6     !BSC1KUTOJA   !     10!LAAJALAHTI270!10    !
BSC1KUTOJA!   3208!7     !BSC1KUTOJA   !     11!TELEKARA060  !11    !
BSC1KUTOJA!   3208!7     !BSC1KUTOJA   !     12!TELEKARA170  !12    !
BSC1KUTOJA!   3208!7     !BSC1KUTOJA   !     13!TELEKARA300  !13    !


              !       !   FR!   FR!   FR!   FR!   FR!   FR!   FR!   FR!   FR!
              !    BTS! Mode! Conf! Conf! Conf! Init!Start! thr1! thr2! thr3!
BTS           ! INT_ID!  Set!hyst1!hyst2!hyst3! Mode! Mode!   dB!   dB!   dB!
--------------!-------!-----!-----!-----!-----!-----!-----!-----!-----!-----!
KUTOJA000     !   3620!  149!    2!    2!    2!    0!    0!    8!   14!   22!
LAAJALAHTI270 !   3398!  149!    2!    2!    2!    0!    0!    8!   14!   22!
```

```
TELEKARA060    !   3408!  149!    2!    2!    2!    0!    0!    8!   14!   22!
TELEKARA170    !   3409!  149!    2!    2!    2!    0!    0!    8!   14!   22!
TELEKARA300    !   3410!  149!    2!    2!    2!    0!    0!    8!   14!   22!

   HR!   HR!   HR!   HR!   HR!   HR!   HR!   HR!   HR!FR Ho! FR Ho!  FR Ho!
 Mode! Conf! Conf! Conf! Init!Start! thr1! thr2! thr2!Intra!Bad CI!Good CI!
  Set!hyst1!hyst2!hyst3! Mode! Mode!   dB!   dB!   dB!rxQua! Ratio!  Ratio!
-----!-----!-----!-----!-----!-----!-----!-----!-----!-----!------!-------!
   21!    2!    2!    0!    0!    0!   22!   28!    0!    0!    10!     17!
   21!    2!    2!    0!    0!    0!   22!   28!    0!    0!    10!     17!
   21!    2!    2!    0!    0!    0!   22!   28!    0!    0!    10!     17!
   21!    2!    2!    0!    0!    0!   22!   28!    0!    0!    10!     17!
   21!    2!    2!    0!    0!    0!   22!   28!    0!    0!    10!     17!

 FR Ho! FR Ho!HR Ho! HR Ho!  HR Ho! HR Ho! HR Ho!
Thr dl!Thr ul!Intra!Bad CI!Good CI!Thr dl!Thr ul!
RxQual!RxQual!rxQua! Ratio!  Ratio!RxQual!RxQual!
------!------!-----!------!-------!------!------!
     4!     4!    4!    10!     17!     4!     4!
     4!     4!    4!    10!     17!     4!     4!
     4!     4!    4!    10!     17!     4!     4!
     4!     4!    4!    10!     17!     4!     4!
     4!     4!    4!    10!     17!     4!     4!

FR PoC!FR PoC!FR PoC!FR PoC!HR PoC!HR PoC!HR PoC!HR PoC
 LoThr! LoThr! UpThr! UpThr! LoThr! LoThr! UpThr! UpThr
dl qua!ul qua!dl qua!ul qua!dl qua!ul qua!dl qua!ul qua
------!------!------!------!------!------!------!------
     3!     3!     0!     0!     3!     3!     0!     0
     3!     3!     0!     0!     3!     3!     0!     0
     3!     3!     0!     0!     3!     3!     0!     0
     3!     3!     0!     0!     3!     3!     0!     0
     3!     3!     0!     0!     3!     3!     0!     0
```

Figure 162. Report 053: AMR parameters

21 Position based services

21.1 Position based services (260)

```
================================================================================
=
=              PBS
=
=              Network:            PLMN
=              Area:               All BTSs selected
=              Period:             from 20020802 to 20020808
=              Hours selection:    all hours counted
=              Time aggregation:   whole period
=              Object aggregation: BTS
=
================================================================================
```

This report shows statistics for Position Based Services.

You can choose Time (total, day, measurement period) and object aggregation level (BTS, BSC, whole area, MR).

Measurements associated: p_nbsc_pbs
Note: The measurement generates statistics only for those BTSs that have PBS events.

```
================================================================================
          !     !                         !   !                    !    !       !
          !     !                         !   !                    !    !       !
          !     !                         !   !                    !    !       !
          !     !                         !   !                    !    !  SDCCH!
          !     !                         !   !                    !    !    req!
          !BSC  !                         !BCF!                    ! BTS!for LCS!
BSC       !id   !BCF                      ! id!BTS                 !  id!  pbs_7!
----------!-----!-------------------------!---!--------------------!----!-------!
BSC1KUTOJA!50264!                         !9  !SATERI90            !  27!   3766!
BSC1KUTOJA!50264!                         !9  !SATERI270           !  28!    242!
BSC1KUTOJA!50264!                         !9  !SATERI280           !  29!     12!


          !       !       !       !       !       !      !      !      !      !
          !       !       !       !       !       !      !      !      !      !
          !       !       !       !       !       !  ****!***LCS!fail**!****  !
  Rejected!   ****!*******!LCS req!*******!*****  !******!******!******!******!
 due to no!*******!*******!*******!*******!*******!   all!   EMG!    MS!    OP!
   support!    all!    EMG!     MS!     OP! unspec!   (%)!   (%)!   (%)!   (%)!
    c78017! c78000! c78002! c78013! c78015!  pbs_8!pbs_1a!pbs_2a!pbs_4a!pbs_5a!
----------!-------!-------!-------!-------!-------!------!------!------!------!
         0!   3766!      0!      0!      0!   3766!   0.1! --   ! --   ! --   !
         0!    242!      0!      0!      0!    242!   0.0! --   ! --   ! --   !
         0!     12!      0!      0!      0!     12!  25.0! --   ! --   ! --   !
```

```
          !      !          !          !          !          !
**********!******!*****E_OTD!method****!**********!**********!
          !      !**********!*rejected*!**********!**********!
          !      !**********!**********!**********!**********!
          !fail  !   not RIT!    insuff!     MS no!not enough!
       req!(%)   !    covera!  BTS info!  support!    values!
    c78004!pbs_3 !    c78011!    c78011!    c78011!    c78011!
----------!------!----------!----------!----------!----------!
      3321!  50.2!        14!         0!       445!         0!
       217!  50.0!         0!         0!        25!         0!
         7!  87.5!         0!         0!         2!         0!

          !     Stand! Stand
          !     alone! alone
          !       GPS!   GPS
          !     *****! *****
      Succ!       Req!  Fail
cell id+TA!          !   (%)
    c78006!    c78007! pbs_6
----------!----------!------
       116!         0! --
        84!         0! --
         2!         0! --
```

Figure 163. Report 260: Position Based Services (PBS)

22 Quality of service

22.1 Quality of service (270)

```
================================================================================
=
=              QoS PI
=
=              Network:              PLMN
=              Area:                 BSC1KUTOJA
=              Period:               from 20030201 to 20030204
=              Hours selection:      all hours counted
=              Time aggregation:     whole period
=              Object aggregation:   Segment
=              Priority class:       All priority classes
=              Sorting selection:    TBF Duration
=              RLC blocks threshold: 100
=
================================================================================

QoS Priority Classes:

DL Gold               =    DL HIGH (Gold)        DHP
DL Silver             =    DL NORM (Silver)      DNP
DL Best Effort        =    DL LOW  (Best Effort) DLP
UL Signalling         =    UL 1    (Signalling)  UP1
UL Gold               =    UL 2    (Gold)        UP2
UL Silver             =    UL 3    (Silver)      UP3
UL Best Effort        =    UL 4    (Best Effort) UP4

Performance Indicators used in this report:

c90000     Number of allocated TBFs.
c90002     Total duration of all the TBFs. (sec)
trf_125    The average transmission rate of DL TBF controlled by MS specific
.          flow control algorithm. (kbit/sec)
c90003     Dropped DL LLC PDUs due to either MS or BVC buffer overflow.
c90004     Dropped DL LLC PDUs due to lifetime expiry.
c90001     Total number of RLC blocks transferred.

Measurements associated: p_nbsc_qos

================================================================================
          !          !             !      !              !
          !          !             !      !              !
          !          !             !      !              !
          !          !             !      !              !
          !          !             !      !QoS           !
          !BSC       !             !   SEG!priority      !
BSC       !id        !Segment      !    id!class         !
----------!----------!-------------!------!--------------!
BSC1KUTOJA!50264     !56BOCHUM1900 !    56!DL Silver     !
```

```
!850BOCHUM53  !    53!DL Silver     !
!56BOCHUM1900 !    56!UL Signalling !
!SATERI265    !    28!DL Silver     !
!TELEKARA060  !    11!DL Silver     !
                     !DL Best Effort!
!TELEKARA300  !    13!DL Silver     !
!56BOCHUM1900 !    56!UL Best Effort!
!850BOCHUM54  !    54!DL Silver     !
!850BOCHUM53  !    53!DL Best Effort!
!SATERI275    !    27!DL Silver     !
!TELEKARA060  !    11!UL Best Effort!
                     !UL Signalling !
```

```
    ****!***TBF***!****     !        !        !
********!*********!*********! Dropped! Dropped!
  Nbr of!    Total!   Avg MS!  DL LLC!  DL LLC!
  Alloc.! duration!    BSSGP!    PDUs!    PDUs!
       !         !flow rate!  buffer!     due! RLC data
       !      sec! kbit/sec!overflow!  expiry!   blocks
  c90000!   c90002!  trf_125!  c90003!  c90004!   c90001
--------!---------!---------!--------!--------!---------
    2690!   170437!      0.5!       0!       0!    12931
   10492!    20193!      0.6!       0!       0!    13214
    2413!    18042!      0.0!       0!       0!     3366
      92!    16515!      2.2!       0!       0!    10580
    2017!     5864!      4.1!       0!       0!    22944
    2082!     5403!      0.0!       0!       0!     9763
     185!     4590!      0.9!       0!       0!    14862
    1621!     3988!      0.0!       0!       0!    52857
     773!     3623!      0.0!       0!       0!        0
      99!     3599!      0.0!       0!       0!    92807
      72!     3527!      2.1!       0!       0!     1536
    3054!     3388!      0.0!       0!       0!     5211
    1390!     2428!      0.0!       0!       0!        0
```

Figure 164. Report 270: Quality of service

22.2 Quality survey (800)

The quality survey report provides a set of KPIs that usually are used for network follow-up.

```
=======================================================================
=
=                   QUALITY SURVEY
=
=                   Network:          PLMN
=                   Area:             All BTSs selected
=                   Period:           from 20020502 to 20020502
=                   Time criteria:    Whole period
=
=======================================================================

This report calculates the basic set of BSS KPIs used to evaluate the
quality of the network.

A more detailed set of KPIs can be found in the benchmark report 204.

Measurements used: p_nbsc_traffic, p_nbsc_ho, p_nbsc_res_access
.                  p_nbsc_res_avail, p_nbsc_rx_qual, p_nbsc_service
```

```
=======================================================================

Number of cells (counted from measurement tables)......:        258
Call attempts (trf_39a)................................:       3441
Handover attempts (ho_13e).............................:        378

Nbr of used frequencies ...............................:         71
. (TRX and its parents are unlocked )
Nbr of TRXs per BTS ...................................:        1.5

Frequency reuse pattern (effective reuse) ......../cnf_1       46.4
. (frequencies/average nbr of TRX per BTS)
. Note: the value makes sense only to large area, eg. more than 50 cells
.       the value makes sense only in nonhopping or baseband hopping area.

TRAFFIC
=======

Average TCH CS traffic/cell (averaged trf_12b) ........:    0.02 Erl
Average SDCCH traffic/cell (averaged trf_11b)..........:    0.00 Erl

TCH USAGE
=================

CS territory usage (trf_3).............................:    0.38 %

RESOURCE AVAILABILITY
=====================

TCH availability (ava_1d)..............................:   68.96 %
SDCCH availability (ava_4).............................:   72.84 %

CALL SUCCESS RATE
=================

TCH Success Ratio (csf_4v).............................:   98.26 %
SDCCH Success Ratio (csf_2m)...........................:   99.62 %

QUALITY
=======

Uplink quality (class 0-5, ulq_2)......................:   98.37 %
Downlink quality (class 0-5, dlq_2)....................:   98.07 %

BLOCKING
========

TCH Blocking (blck_8d).................................:    0.28 %
.  Number of cells with blocking <= 2%.................:      48
.  Number of cells with blocking 2 - 5%................:       0
.  Number of cells with blocking 5 - 10%...............:       0
.  Number of cells with blocking > 10%.................:       1
SDCCH Blocking (blck_5a)...............................:    0.01 %

HANDOVERS
=========

Unsuccessful handovers due to lack of resources (hfr_55):   38.89 %
Failed handovers (hfr_54a)..............................:    4.76 %

TCH DROPPED CALLS
=================
```

```
Dropped call rate (dcr_3j).............................:    1.74 %
```

Figure 165. Report 800: Quality survey

23 Other measurable qualities

There are numerous measurable features which you can use to analyse the problems in the network. In the following, some of the most frequently used ones are presented:

- uplink and downlink quality and level
- link balance
- cell coverage (distance ranges)
- handover cause
- handover
- BSC clear codes
- troubleshooting
- HSCSD

23.1 Uplink and downlink quality and level

BSS Network Doctor provides several optional reports to monitor UL and DL occurrences at various network levels.

23.1.1 Uplink and downlink quality on area level

For daily distribution of UL and DL quality to classes 0-7, choose the report **Performance statistics (benchmark)** (200).

23.1.1.1 Reports based on RX quality

```
================================================================================
=                     UL, DL QUALITY ANALYSIS
================================================================================
Uplink quality cumulative distribution (%):

Day MMDD   Qual0   Qual1   Qual2   Qual3   Qual4   Qual5   Qual6   Qual7
--- ---- ------- ------- ------- ------- ------- ------- ------- -------
```

```
tue 1121   97.53   98.05   98.50   99.01   99.40   99.64   99.89  100.00
mon 1120   98.76   99.03   99.25   99.55   99.72   99.83   99.93  100.00
sun 1119   95.49   96.07   99.02   99.59   99.93   99.93   99.93  100.00

Downlink quality cumulative distribution (%):

Day MMDD   Qual0   Qual1   Qual2   Qual3   Qual4   Qual5   Qual6   Qual7
--- ---- ------- ------- ------- ------- ------- ------- ------- -------
tue 1121   73.03   83.26   94.14   98.50   99.50   99.87   99.99  100.00
mon 1120   90.81   94.78   97.67   98.73   99.30   99.62   99.77  100.00
sun 1119   91.62   93.96   98.75   99.76   99.86  100.00  100.00  100.00

Note: For a TRX level list, run report 196.
```

Figure 166. Area level data on UL and DL quality in report 200, Performance statistics (benchmark).

For the average distribution of UL and DL quality, run the report **Network benchmark statistics** (204).

```
Cumulative uplink quality distribution (ulq_2) :

  Qual0   Qual1   Qual2   Qual3   Qual4   Qual5   Qual6   Qual7
------- ------- ------- ------- ------- ------- ------- -------
  97.44   97.98   98.50   98.91   99.17   99.32   99.51  100.00
```

Figure 167. Average distribution of UL and DL quality in report 204, Network benchmark statistics.

23.1.1.2 Reports based on RX level statistics

For the average distribution of UL and DL quality versus RX level range, run the report **Network benchmark statistics** (204).

```
Cumulative downlink quality distribution (dlq_2) :
Note: For TRX level list run report 196.


  Qual0   Qual1   Qual2   Qual3   Qual4   Qual5   Qual6   Qual7
------- ------- ------- ------- ------- ------- ------- -------
  94.27   95.39   97.61   99.14   99.55   99.82   99.92  100.00
```

Figure 168. Average distribution of UL and DL quality versus RX level range in the Network benchmark statistics (204) report.

23.1.2 Uplink and downlink quality on TRX hit list

23.1.2.1 Reports based on RX quality

The report **UL and DL quality and UL interference per TRX, 24-hour/10-day breakdowns** (196) is based on the optional BSC measurement RX Quality.

```
===============================================================================
                UL, DL Quality and UL Inteference per TRX (Part 1)

                         between 19980530 and 19980608
                   sorted by bsc_name,bcf_name,bts_name asc

                                q 0 q 1 q 2 q 3 q 4 q 5 q 6 q 7
                                (%) (%) (%) (%) (%) (%) (%) (%)
                                *** *** *** *** *** *** *** ***
BSC Name      BCF Name          UL  UL  UL  UL  UL  UL  UL  UL  Call min Intrf
(BTS) TRX     BTS Name          DL  DL  DL  DL  DL  DL  DL  DL  Call dif Freq
------------- ------------- --- --- --- --- --- --- --- --- -------- -----
LINDA         LINDA              73  77  82  87  92  95  99 100     4051   1.1
(1) trx:1     Cid 5001           85  87  90  93  95  98  99 100        1  chgd

LINDA         LINDA              99 100 100 100 100 100 100 100      149   1.0
(30) trx:1    Cid 5030           77  84  90  94  97  99 100 100        4    48

LINDA         LINDA              74  81  88  93  97  98  99 100     2246   1.0
(66) trx:1    Cid 5066           87  90  93  95  96  97  99 100        1  chgd
```

Figure 169. Report 196: UL and DL quality and UL interference per TRX, 24-hour/10-day breakdowns

23.1.2.2 Reports based on RX level statistics

The report **UL and DL quality per TRX** (197) is based on the optional BSC measurement Rx Level Statistics.

```
===============================================================================


                          UL and DL quality per TRX
                        between 20010402 and 20010404

                                  %in  %in  %in  %in  %in  %in  %in  %in
                                  q 0  q 1  q 2  q 3  q 4  q 5  q 6  q 7
                                  ***  ***  ***  ***  ***  ***  ***  ***     Call
BSC Name      BCF Name            UL   UL   UL   UL   UL   UL   UL   UL      time
(BTS) TRX     BTS Name            DL   DL   DL   DL   DL   DL   DL   DL     (min)
------------- --------------- ---- ---- ---- ---- ---- ---- ---- ---- -------
BSC1KUTOJA    KUTOJA001            100  100  100  100  100  100  100  100      22
(1) trx:2     KUTOJATALKFAM1       100  100  100  100  100  100  100  100

BSC1KUTOJA    KUTOJA001              0    0    0    0    0    0    0    0       0
(1) trx:1     KUTOJATALKFAM1         0    0    0    0    0    0    0    0

BSC1KUTOJA    LAAJAL010              0    0    0    0    0    0    0    0       0
(10) trx:1    LAAJAL1010             0    0    0    0    0    0    0    0

BSC1KUTOJA    KILO007                0    0    0    0    0    0    0    0       0
(11) trx:2    TKARA11                0    0    0    0    0    0    0    0
```

```
BSC1KUTOJA    KILO007           0    0    0    0    0    0    0    0        0
(11) trx:1    TKARA11           0    0    0    0    0    0    0    0

BSC1KUTOJA    KILO007           0    0    0    0    0    0    0    0        0
(12) trx:4    TKARA12           0    0    0    0    0    0    0    0

BSC1KUTOJA    KILO007         100  100  100  100  100  100  100  100        4
(13) trx:6    TKARA13         100  100  100  100  100  100  100  100

BSC1KUTOJA    KILO007         100  100  100  100  100  100  100  100       17
(13) trx:5    TKARA13          99  100  100  100  100  100  100  100
```

Figure 170. Report 197: UL and DL quality per TRX

23.1.3 Uplink and downlink quality on BTS level

On the BTS level, choose from BSS Network Doctor the report you need according to what type of measurement the reports are based on.

23.1.3.1 Reports based on RX quality

For worst values and TRX specific values, run the report **Cell analyser** (216).

```
===============================================================================
=                           Cell DL, UL quality
=                 BSC1KUTOJA      bts id:20  name:SANDPD1020
=                  from 19990917 to 19990920
===============================================================================
Note: The used measurement 'Rx Quality' is an optional BSC feature.

.                                                     Whole
.                                                     period
.                                                     average
.                                                     =======
.
DL call samples in q0-q5, worst value.(TRX level)       18.18 %
UL call samples in q0-q5, worst value.(TRX level)       72.73 %

      UL q0-5  DL q01-5 UL q0-5 DL q0-5
TRX       (%)       (%)     (%)     (%) Traffic
 id Busy Hour Busy Hour average average     (%)
--- --------- --------- ------- ------- -------
  3      90.8      85.5    82.3    68.5   100.0
```

Figure 171. Worst and TRX specific values of UL and DL quality on the basis of RX quality in report 216, Cell analyser.

This report shows also the hourly breakdown of UL and DL cumulative quality q0-q5.

```
************************************************************************

DL call samples in q0-q5 (%)  (dlq_2)
BSC1KUTOJA      BCF:SANDPD010       BTS:20 SANDPD1020      trx:3
************************************************************************
```

-1 = dividor was zero and ratio could not be counted
Blank hours are missing data (only hours with TCH samples are reported to OMC).

Hints: For BTS level hit list run the report 196.

Hr	fri 10 SEP	sat 11 SEP	sun 12 SEP	mon 13 SEP	tue 14 SEP	wed 15 SEP	thu 16 SEP	fri 17 SEP	sat 18 SEP	sun 19 SEP	mon 20 SEP
08	98				98			87			
09	51				54	100	100	93			100
10	17			100	82	98	100	100			100
11	94				94		100	68			100
12	100			100	75	72	97	100			
13	100			93	100	17	100	99			
14	87			100		100	100	100			98
15	99			100	95		100	100			
16	100			100			100				18

Figure 172. Cumulative UL and DL quality on the basis of RX quality in report 216, Cell analyser.

For per hour, run the report **Cell doctor** (213).

Downlink quality/level distribution

TRX id	TRX freq	TRX freq grp	dd	hh	Call time (min) trf_32b	Rx lev range (dBm)	DL q0 (%)	DL q1 (%)	DL q2 (%)	DL q3 (%)	DL q4 (%)	DL q5 (%)	DL q6 (%)	DL q7 (%)
5	83	1	23	00	25	-100	0	0	0	0	0	0	0	0
						-95	1	0	0	0	0	0	0	0
						-90	6	0	0	0	0	0	0	0
						-80	39	1	0	1	1	1	0	0
						-70	28	0	0	0	0	0	0	0
						> -48	19	0	0	0	0	0	0	0
				01	9	-100	0	0	0	0	0	0	0	0
						-95	0	0	0	0	0	0	0	0
						-90	2	0	0	0	0	0	0	0
						-80	21	0	0	0	0	0	0	0
						-70	33	0	0	0	0	0	0	0
						> -48	42	0	0	0	0	0	0	0

Uplink quality/level distribution

TRX id	TRX freq	TRX freq grp	dd	hh	Call time (min) trf_32b	Rx lev range (dBm)	UL q0 (%)	UL q1 (%)	UL q2 (%)	UL q3 (%)	UL q4 (%)	UL q5 (%)	UL q6 (%)	UL q7 (%)
5	83	1	23	00	25	-100	9	0	1	0	0	0	0	0
						-95	8	0	0	0	0	0	0	0
						-90	8	0	0	0	0	0	0	0
						-80	47	0	0	0	0	0	0	0
						-70	18	0	0	0	0	0	0	0
						> -48	7	0	0	0	0	0	0	0
				01	9	-100	1	0	0	0	0	0	0	0
						-95	4	0	0	0	0	0	0	0
						-90	3	0	0	0	0	0	0	0

```
-80      45     0     0     0     1     0     0     0
-70      31     0     0     0     0     0     0     0
> -48    13     0     0     0     0     0     0     0
```

Figure 173. Hourly distribution of UL and DL quality in report 213, Cell doctor.

23.1.3.2 Reports based on RX level statistics

BSC measurements based on RX level statistics are provided by the report **Cell analyser** (216).

```
===============================================================================
=                  Cell DL, UL quality/level distribution
=                 BSC7SALO        bts id:12  name:MONITORI12
=                  from 20011119 to 20011119
===============================================================================
Note1: The used measurement 'Rx Level Statistics' is an optional BSC feature.
Note2: If RX-level sub range[1...5] settings overlap the total quality
.      distribution may exceed 100 %.

Rx lev range (dBm) = upper boundary (level) of range


Uplink quality/level distribution

     Rx lev     UL      UL      UL      UL      UL      UL      UL      UL
 TRX range      q0      q1      q2      q3      q4      q5      q6      q7
  id (dBm)     (%)     (%)     (%)     (%)     (%)     (%)     (%)     (%)    SAMPLES
---- ------ ------ ------ ------ ------ ------ ------ ------ ------ ----------
   5 -100      0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0          0
     -95       0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0          0
     -90       2.2     0.0     0.0     0.0     0.0     0.0     0.0     0.0          2
     -80      60.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0         54
     -70      37.8     0.0     0.0     0.0     0.0     0.0     0.0     0.0         34
     -47       0.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0          0
****        ------ ------ ------ ------ ------ ------ ------ ------
sum          100.0     0.0     0.0     0.0     0.0     0.0     0.0     0.0
```

Figure 174. BSC measurements based on Rx-level statistics in report 216, Cell analyser.

For UL and DL quality distribution per hour, run the report **Cell doctor** (213).

```
Downlink quality/level distribution

                               Call
                TRX            time Rx lev  DL    DL    DL    DL    DL    DL    DL    DL
 TRX   TRX  freq               (min) range   q0    q1    q2    q3    q4    q5    q6    q7
  id  freq   grp dd hh trf_32b (dBm)  (%)   (%)   (%)   (%)   (%)   (%)   (%)   (%)
---- ----- ----- -- -- ------- ----- ---- ---- ---- ---- ---- ---- ---- ----
   5    83     1 23 00      25 -100      0     0     0     0     0     0     0     0
                               -95       1     0     0     0     0     0     0     0
                               -90       6     0     0     0     0     0     0     0
                               -80      39     1     0     1     1     1     0     0
                               -70      28     0     0     0     0     0     0     0
                               > -48    19     0     0     0     0     0     0     0

                    01       9 -100      0     0     0     0     0     0     0     0
```

```
                                            -95       0     0     0     0     0     0     0     0
                                            -90       2     0     0     0     0     0     0     0
                                            -80      21     0     0     0     0     0     0     0
                                            -70      33     0     0     0     0     0     0     0
                                            > -48    42     0     0     0     0     0     0     0

Uplink quality/level distribution

                                      Call
                           TRX        time Rx lev   UL    UL    UL    UL    UL    UL    UL    UL
 TRX    TRX  freq               (min) range   q0    q1    q2    q3    q4    q5    q6    q7
  id   freq   grp dd hh trf_32b (dBm)   (%)   (%)   (%)   (%)   (%)   (%)   (%)   (%)
---- ----- ----- -- -- ------- ------ ---- ---- ---- ---- ---- ---- ---- ----
   5     83     1 23 00      25 -100      9     0     1     0     0     0     0     0
                                -95       8     0     0     0     0     0     0     0
                                -90       8     0     0     0     0     0     0     0
                                -80      47     0     0     0     0     0     0     0
                                -70      18     0     0     0     0     0     0     0
                                > -48     7     0     0     0     0     0     0     0

                     01       9 -100      1     0     0     0     0     0     0     0
                                -95       4     0     0     0     0     0     0     0
                                -90       3     0     0     0     0     0     0     0
                                -80      45     0     0     0     1     0     0     0
                                -70      31     0     0     0     0     0     0     0
                                > -48    13     0     0     0     0     0     0     0
```

Figure 175. Hourly distribution of UL and DL quality in report 213, Cell doctor.

23.2 Link balance

Link balance is an important quality factor. A common target is to reach +-3 dB and at least +-5 dB. When analysing the results, note that the BCCH TRX is always on full power and that it affects the results on the BTS level, thus making them difficult to interpret.

23.2.1 Link balance on area level

To obtain the percentage of measurement samples per balance class/power limit class, run the report **Cells by DL and UL level balance** (195). Although not very accurate, it offers an option if the Link Balance measurement is not available.

```
TRXs by signal level balance

                                    between 20011016 and 20011016

               !    !               !               !   !   ave!   ave!
               !    !               !               !   !    MS!    BS!
               !    !               !               !   !   pwr!   pwr!
               ! BTS!               !               !   !  attn!  attn!
BSC            !  id!BCF            !BTS            !TRX!  (dB)!  (dB)!
---------------!----!---------------!---------------!---!------!------!
BSC4TRE        !  10!1900_3Ail      !10HERMIA3A     !  2!   0.0!  12.6!
BSC4TRE        !  75!               !75OULUNMP      !  9!   0.7!   6.6!
BSC4TRE        !  22!3C1krs         !22HERMIA3C1KRS !  2!   5.0!   2.0!
BSC4TRE        !  73!               !73OULUNMP      !  1!   0.0!   0.0!
BSC4TRE        !  75!               !75OULUNMP      ! 10!   0.6!   0.0!
```

```
BSC7SALO        !  27!                 !MONITORI27     !  1!   0.0!   0.0!
BSC MERKURIUS   ! 121!Ultra_BTS2       !JTUOMINENTRSR11!  2!  28.0!  30.0!


      !      !         !
      !      !         !
   ave!   ave!  average!
    UL!    DL!     link!   Nbr of
   str!   str!imbalance!   samples
------!------!---------!----------
  13.7!  32.3!     31.2!        46
  10.8!  34.2!     29.3!        61
   0.0!  31.5!     28.5!         2
  16.2!  43.4!     27.2!        92
  10.6!  34.1!     23.0!       559
   0.7!  22.5!     21.8!        79
  43.0!  59.0!     18.0!         4
```

Figure 176. Link balance in report 195, Cells by DL and UL level balance

The **Link balance of an area** (199) report is based on the link balance measurement.

```
===============================================================================

                                             MS      BS     Max
           Link balance    Normal limited limited  power
   Samples (dB)               (%)     (%)     (%)    (%)
---------- --------------- ------ ------- ------- ------
  31878057 -20 to -15           0       0       0      0
           -14 to -10           1       0       0      0
           -09 to -06           2       1       0      1
           -05 to -03           2       1       0      1
           -02 to -01           2       0       0      1
           0                    2       1       0      1
           01 to 02             5       2       0      2
           03 to 05             4       2       0      3
           06 to 09             6       5       1      8
           10 to 14             5       5       3     13
           15 to 20             3       2       6      8
```

Figure 177. Report 199: Link balance of an area

23.2.2 Link balance on BTS hit list

The report **Cells by DL and UL level balance** (195) is based on Power Control measurement. Although not very accurate, it offers an option if the Link Balance measurement is not available.

The report **Cells having bad link balance** (191) is based on the Link Balance measurement. It provides you with a list to find the cells from an acceptable balance range.

```
===============================================================================
=
=                   CELLS HAVING BAD LINK BALANCE (DL, UL)
=
=                   Network:             PLMN
=                   Area:                BSC - BSC1KUTOJA
=                   Period:              from 19991117 to 19991117
=                   Acceptance range:    -5dB ... 5dB
=                   Presence threshold:  100 %
=                   Sorting:             Samples in acc. range
=
===============================================================================

For each cell the share (%) of samples in the given range is counted.
Cell having less than the given % of samples in the range are reported.

Samples in acc. range  /lb_2  Share of samples in acceptable
.                             balance range (%)
Normal                 /lb_3  Share of path balance measurements when
.                              MS power < MS TX PWR MAX and
.                              BS power < BS TX PWR MAX (normal)
MS limited             /lb_4  Share of samples when MS full power
.                              MS power = min(MS TX PWR MAX, MS MAX PEAK POWER)
.                              and BS power < BS TX PWR MAX
BS limited             /lb_5  Share of samples when BS full power
.                              MS power < MS TX PWR MAX and
.                              BS power = BS TX PWR MAX
Max power              /lb_6  Share of sample when MS and BS full power
.                              MS power = min(MS TX PWR MAX, MS MAX PEAK POWER)
.                              and BS power = BS TX PWR MAX

Measurement used: p_nbsc_link_balance

Note: Running this report takes a while. Patience please.

===============================================================================


       Cells having less or equal to 100 % of samples in acceptance range
                          between 19991117 and 19991117

                                            Samples
                                                 in              MS      BS   max
BSC Name        BCF Name              acc. range normal limited limited power
(BTS id)        BTS Name                     (%)    (%)     (%)     (%)   (%)
--------------- ------------------ ---------- ------ ------- ------- -----
BSC1KUTOJA      KUTOJA001                     8      0       0       6    94
(2)             KUTOJA1002

BSC1KUTOJA      SANDPG009                    29      0       0       0   100
(18)            SANDPG1018

BSC1KUTOJA      SUOSAA004                    30      0       0      20    80
(6)
```

Figure 178. Report 191: Cells having bad link balance

The report **Link balance per cell** (208) is based on Power Control measurement.

```
===============================================================================
=
=                   LINK BALANCE PER TRX
=
=                   Network:            PLMN
```

```
=                   Area:               All BTSs selected
=                   Period:             from 20000608 to 20000608
=                   Sorted by:          Balance difference
=                   Combiner loss (single TRX cells):       -2.1
=                   Combiner loss (multi TRX cells) :       -5.2
=                   BTS RX diversity gain:         0
=                   Threshold for balance :          0
=
===============================================================================

This report counts the power loss balance between UL and DL for each TRX of
each cell of the selected area. In this report it is assumed that the max BS
power is 44.7 dBm.

For each TRX the following data is displayed.:

DL loss factors:
****************
.  BS power (dBm)      /pwr_2  Average BS power level  (max.power is 44.7)
.  combiner loss (dBm)         Depends on network. Given by user for single TRX
.                              and multi TRX cases.
.  DL sig st (dBm)     /lev_1  Average DL signal strength measured by MS.

DL path loss  (dBm)            Counted based on the factors above.
.                              (BS power - combiner loss - DL sig st)

UL loss factors:
****************
.  MS power (dBm)     /pwr_1b  Average MS power level.
.  UL sig str (dBm)   /lev_2   Average UL signal strength measured by BTS.

UL path loss (dBm)             Counted based on the factors above.
.                              (MS power - UL sig st)

Balance
****************
DL-UL (dB)                     The difference between DL and UL path losses.
Delta                          Difference between balances of TRXs having
.                              the biggest and smallest balance with a cell

Measurement periods without traffic are excluded in calculation.

Measurement used: p_nbsc_power

Running this report takes a few minutes. Patience please.

===============================================================================


                              Link balance per TRX
                 between 20000608 and 20000608 in PLMN network

                          DL loss factors        UL loss factors
                          ***************        ***************         Balance
BCF            BCFtype    BS power            DL MS power             UL ******
BTS            BTS id     combiner loss     path                    path DL-UL
BSC            TRX id     DL sig str        loss UL sig str         loss Delta
-------------- ---------- --------------- ------ --------------- ------ -------
PP             InSite           32.9       110.1      28.2        111.8   -1.7
PPSOUTH5W      23               -5.2                                      11.2
BSC MERKURIUS  1               -82.4                 -83.6

PP             InSite           44.7       149.5      30.0        140.0    9.5
PPSOUTH5W      23               -5.2                                      11.2
BSC MERKURIUS  2              -110.0                -110.0

TL A           InSite           38.7       105.5      30.0        107.0   -1.5
TLANORTH       28               -5.2                                      11.0
```

BSC MERKURIUS	3	-72.0		-77.0		
TL A	InSite	44.7	149.5	30.0	140.0	9.5
TLANORTH	28	-5.2				11.0
BSC MERKURIUS	4	-110.0		-110.0		
KILO007	TalkFamily	44.7	131.3	30.0	130.3	1.0
TKARA12		-5.2				4.1
BSC1KUTOJA	12	-91.8		-100.3		
	3					
KILO007	TalkFamily	44.7	124.4	30.0	127.5	-3.1
TKARA12		-5.2				4.1
BSC1KUTOJA	12	-84.9		-97.5		
	4					

Figure 179. Report 208: Link balance per cell

23.2.3 Link balance on BTS level

For information on link balance breakdown on the BTS level over a period of time, run the report **Cell analyser** (216).

Samples	MS power levels path balance (dB)	Normal (%)	MS limited (%)	BS limited (%)	Max power (%)
2959	-20 to -15	0	0	0	0
	-14 to -10	0	0	0	0
	-09 to -06	0	0	0	0
	-05 to -03	0	0	0	0
	-02 to -01	0	0	0	1
	0	0	0	0	1
	01 to 02	0	0	0	7
	03 to 05	0	0	0	18
	06 to 09	0	0	0	40
	10 to 14	0	0	0	30
	15 to 20	0	0	0	2

Figure 180. BTS level data on link balance as shown in report 216, Cell analyser.

The report **Cell doctor** (213) provides the best time resolution, but normally, due to the load on the network, the measurement period is set to 24 or 12 hours, and so the resolution is not any better than that of the **Cell analyser** (216) report.

dd	hh	Samples	Link balance (dB)	Normal (%)	MS limited (%)	BS limited (%)	Max power (%)
22	00	6169	-20 to -15	0	0	0	0
			-14 to -10	0	0	0	0
			-09 to -06	0	0	0	1
			-05 to -03	0	0	0	6
			-02 to -01	0	0	0	3
			0	0	0	0	2
			01 to 02	1	1	0	5

```
03 to 05          1      1      0     9
06 to 09          2      2      1    11
10 to 14          1      3      4    27
15 to 20          0      1      3    10
```

Figure 181. BTS level data on link balance as shown in report 213, Cell doctor.

In the **Cells by dominant link balance range** (198) report the cells are listed according to the dominant path balance range, i.e the range having biggest share of the path balance measurement samples.

```
===============================================================================

                        Cells by dominant Path Balance range

                                             MS pwr lev Share in
                                             path bal      range
BSC (BTS id)    BTS/BCF NAME                 (dB)            (%)
--------------- ------------------ ---------- --------
BSC41           84                 10 to 14         51
(6)             Brown Hill

BSC41           15168              10 to 14         52
(63)            Newcastle

BSC41           116                15 to 20         80
(49)            Arrow head

BSC44           259                15 to 20         53
(52)            Museum
```

Figure 182. Report 198: Cells by dominant link balance range.

23.3 MS speed

MS Speed reports are based on the MS Speed measurement which is an optional BSC feature.

In the **Cell doctor** (213) report the MS Speed per measurement period is shown for one BTS.

```
===============================================================================
=                           BTS -  MS SPEED
=                 BSC4TRE bts id:75  name:75OULUNMP
=                  from 20020814 to 20020814
===============================================================================

Note:
- The used measurement 'MS SPEED' is an optional BSC feature.
- BTS version DF3.0 or B10 needed.
- Speed class limits can be modified by MML command ZEGI (S6) and EEQ (S7).


      Speed        Speed        Speed        Speed     Speed     Speed
```


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```
      class 1     class 2     class 3     class 1   class 2   class 3
DD HR samples     samples     samples     (km/h)    (km/h)    (km/h)
-- -- ----------- ----------- ----------- --------- --------- ---------
14 00  33901(98%)    523(2%)       1(0%)  0...20    21...60   61...512 -
```

Figure 183. MS speed per measurement period in report 213, Cell doctor.

23.3.1 Cells by MS speed (233)

```
================================================================================
=
=                   CELLS BY MS SPEED
=
=                   Network:            PLMN
=                   Area:               All BTSs selected
=                   Period:             from 19980714 to 19980714
=                   Sorted by:          by Speed Class 1
=
================================================================================

Note:

- The used measurement 'MS SPEED' is an optional BSC feature.
- BTS version DF3.0 or B10 needed.
- Speed class limits can be modified by MML command ZEGI (S6) and EEQ (S7).
- Speed classes are average values in this report. If limits have been changed,
. decimal values might be displayed.


Measurement used: p_nbsc_ms_speed

================================================================================


                                Cells by MS Speed
                          between 19980714 and 19980714

BTS                 Speed     Speed     Speed     Speed     Speed     Speed
 BCF                class 1   class 1   class 2   class 2   class 3   class 3
 BSC (BTS id)       (km/h)    samples   (km/h)    samples   (km/h)    samples
-----------------  --------- --------- --------- --------- --------- ---------
KILO1012           0...20     100.00%  21...60      0.00%  61...512     0.00%
 KILO007
 BSC1KUTOJA (12)

KILO1013           0...20     100.00%  21...60      0.00%  61...512     0.00%
 KILO007
 BSC1KUTOJA (13)

HER3AP3014         0...20     100.00%  21...60      0.00%  61...512     0.00%
 HERMIA005
 BSC3TRE (14)
```

Figure 184. Report 233: Cells by M

23.4 Handover

23.4.1 TRHO handovers (155)

```
===============================================================================
=
=              TRHO HANDOVERS (AMH)
=
=              Network:            test-plmn
=              Area:               BSC -   85964
=              Period:             from 20030127 to 20030205
=              Time aggregation:   whole period
=              Object aggregation: BTS
=
===============================================================================

This report shows the counters related to Advanced Multilayer Handling for those
cells that have either TCH requests for a BSC controlled TRHO or HO attempts
to another cell due to BSC controlled TRHO.

TRHO att (src)      c4035 HO attempts to another cell due to BSC controlled TRHO
.                         (triggered in the source cell whereas other counters
.                          are triggered in the target cell)
TRHO req (tgt)      c1167 TCH requests for a BSC controlled TRHO
TRHO seiz(tgt)      c1168 Successful TCH seizures for BSC controlled TRHO
TRHO rej (tgt)      c1169 Rejected TCH requests for a BSC controlled TRHO due
.                         to exceeded load in the target cell

tgt = target, src=source

Measurement used: Traffic, Handover

Note: Running this report takes a while. Patience please.

===============================================================================
```

BSC	BCF	Segment	Seg id	BTS	BTS id	TRHO att (src) c4035	TRHO req (tgt) c1167	TRHO seiz (tgt) c1168	TRHO rej (tgt) c1169
CARMEN	CARMEN	MANSELL1	11	MANSELL1	11	70	167	168	169
CARMEN	CARMEN	MANSELL2	12	MANSELL2	12	70	167	168	169
CARMEN	CARMEN	MANSELL3	13	MANSELL3	13	70	167	168	169
CARMEN	CARMEN	PROST1	21	PROST1	21	70	167	168	169
CARMEN	CARMEN	PROST2	22	PROST2	22	70	167	168	169
CARMEN	KENNY	KENNY1	91	KENNY1	91	70	167	168	169
CARMEN	OMAR	OMAR41	41	OMAR41	41	70	167	168	169
CARMEN	OMAR50	OMAR51	51	OMAR51	51	70	167	168	169
CARMEN	PIRNES	MANSELL1	11	PIRNES1	31	70	167	168	169
CARMEN	torni	TORNI1	81	TORNI1	81	70	167	168	169
CARMEN	torni	TORNI2	82	TORNI2	82	70	167	168	169
CARMEN	torni	TORNI3	83	TORNI3	83	70	167	168	169
CARMEN		ALEN1	61	ALEN1	61	70	167	168	169
CARMEN	PIRNES	PIRNES2	32	PIRNES2	32	70	167	168	169
CARMEN	BCF188		199	BTS199	199	70	167	168	169
CARMEN	BCF188		200	BTS179	179	70	167	168	169

Figure 185. Report 155: TRHO handovers

23.4.2 DADLB handovers (156)

```
==============================================================================
=
=             DADLB handovers
=
=             Network:             PLMN
=             Area:                BSC -   50264
=             Period:              from 20010703 to 20010703
=             Time aggregation:    whole period
=             Object aggregation: BTS
=
==============================================================================

This report shows the counters related to DADLB (Direct Access to Desired Layer
or band) per selected object level (area/BSC/BTS) and per selected time
aggregation (total/daily/hourly).


Cell as HO source:
DADLB start (src)     c1172 BTS load threshold is execeed and a HO is asked
DADLB HO att (src)    c4129 HO attempt started.

Cell as HO target:
DADLB succ seiz (tgt) c1170 Successful TCH seizures due to DADLB HO
DADLB rej (tgt)       c1171 TCH requests in DADLB HO rejected due to lack of TCH

Measurement used: Traffic, Handover

Note: Running this report takes a while. Patience please.

==============================================================================


             !           !                !   !        !   DADLB!   DADLB!
             !           !                !   !   DADLB!     HO!    succ!   DADLB
             !           !                !   !   start!    att!    seiz!     rej
             !           !                !BTS!   (src)!   (src)!   (tgt)!   (tgt)
BSC          !BCF        !BTS             !id !   c1172!   c4129!   c1170!   c1171
-------------!-----------!----------------!---!--------!--------!--------!--------
BSC1KUTOJA   !KUTOJA001  !KUTOJATALKFAM1  !1  !       1!       1!       0!       0
BSC1KUTOJA   !KUTOJA001  !KUTOJATALKFAM2  !2  !       0!       0!       2!       0
BSC1KUTOJA   !SUOSAA004  !SUOSAA1006      !6  !       0!       0!       0!       0
BSC1KUTOJA   !SUOSAA004  !SUOSAA1007      !7  !       0!       0!       0!       0
BSC1KUTOJA   !KILO007    !TKARA11         !11 !       0!       0!       0!       0
```

Figure 186. Report 156: DADLB handovers

23.4.3 Intra BSS HO observation statistics (158)

```
==============================================================================
=
=                  INTRA BSS HO OBSERVATION STATISTICS
=
=                  Network:   PLMN
=                  Objects:   BTS int_id = 3456
=                  Period:    from 19981125 to 19981125
=
==============================================================================

This report counts the HO attempts, failure % and drop % for various HO cases.
```

```
HO Drop %   100*(sum of HOs with ho_fail_cause  = 6) / nbr of HOs
HO Fail %   100*(sum of HOs with ho_fail_cause != 0) / nbr of HOs

Observation used: p_nbsc_int_ho_obs

================================================================================



Intra cell to alternative carrier:
**********************************

Source               Target      HO     HO
BSC/BTS/TRX          BTS/TRX  drop%  fail%        HOS
-------------------- ------- ------ ------ ----------
BSCSBC/39/5          39/11      0.0    0.0          1
                     39/12      0.0    0.0          1
BSCSBC/39/6          39/5       0.0    0.0          5
BSCSBC/39/11         39/5       0.0    0.0          4
BSCSBC/39/12         39/11      0.0    0.0          1

5 rows selected.

Intra cell to same carrier:
***************************

no rows selected

Intra site, synchronous:
*************************

Source               Target      HO     HO
BSC/BTS/TRX          BTS/TRX  drop%  fail%        HOS
-------------------- ------- ------ ------ ----------
BSCSBC/39/5          39/11      0.0    0.0          1
                     39/12      0.0    0.0          1
BSCSBC/39/6          39/5       0.0    0.0          5
BSCSBC/39/11         39/5       0.0    0.0          4
BSCSBC/39/12         39/11      0.0    0.0          1

5 rows selected.

Intra site, asynchronous:
*************************

no rows selected

Inter cell, intra BSS:
**********************

Source               Target      HO     HO
BSC/BTS/TRX          BTS/TRX  drop%  fail%        HOS
-------------------- ------- ------ ------ ----------
BSCSBC/39/5          29/3       0.0    0.0         36
                     29/4       0.0    0.0         18
                     39/11      0.0    0.0         15
                     39/12      0.0    0.0         15
BSCSBC/39/6          39/5       0.0    0.0         75
BSCSBC/39/11         29/4       0.0    5.6         18
                     39/5       0.0    0.0         60
BSCSBC/39/12         39/11      0.0    0.0         15
```

Figure 187. Report 158:Intra BSS HO observation statistics

23.5 Cell coverage

Cell coverage reports are based on the Timing Advance measurement.

23.5.1 Dominant distance range on BTS list

In the report **Cells by dominant distance range** (231), BTSs are listed according to the distance range where most of the measurement samples are.

```
===============================================================================
=
=                   CELLS BY DOMINANT DISTANCE RANGE
=
=                   Network:            PLMN
=                   Area:               BSC - BSC1KUTOJA
=                   Period:             from 19991117 to 19991117
=                   Threshold :                  0 % of samples
=                   Order by :          Distance Range upper limit,
=                                       share in range
=
===============================================================================

In this report the cells are listed according to the dominant distance
range, in other words the range having the biggest share of the meas. samples.
The Distance Range is based on Timing Advance.

Share in range (%)                Percentual share of path balance measurements

Measurement used: Timing Advance

Instructions:  Use Cell Analyser (216) to study the details.

Note: Running this report takes a while. Patience please.

===============================================================================


                        Cells by dominant Distance Range

                                   Distance Distance
                                   range    range
                                   lower    upper    Share in
                                   limit    limit       range
BSC (BTS id)    BTS/BCF NAME       (km)     (km)          (%)
--------------- ------------------ -------- -------- --------
BSC1KUTOJA      KUTOJA1002            0.550    1.100      100
(2)             KUTOJA001

BSC1KUTOJA      SANDPG1018            0.550    1.100      100
(18)            SANDPG009

BSC1KUTOJA      KILO1011              0.550    1.100      100
(11)            KILO007

BSC1KUTOJA                            0.550    1.100       98
(6)             SUOSAA004

BSC1KUTOJA      KKALLI1016            0.550    1.100       61
(16)            KILONKALLIO008
```

```
BSC1KUTOJA       SANDPD1019              2.750    3.300       78
(19)             SANDPD010
```

Figure 188. Report 231: Cells by dominant distance range

23.5.2 Distance ranges on BTS hit list

The report **Distance range distribution per cell** (232) offers a detailed distribution of occurrences to distance ranges and power classes. The output is typically very long and therefore you should run it for a limited area only.

```
===============================================================================

 BSC:BSC4TRE  BTS:7HERMIA3A (7)  BCF:1800_3Ail (3)

            Distance            Share
               upper               in min    max    ave
TRX     EXT    range  Freq of   range power  power  power
type   (km)     (km)  reports     (%) (dBm)  (dBm)  (dBm)
------ ---- -------- -------- ------- ------ ------ ------
normal    0     1.10     7065   99.69     20     30
normal    0     2.20       22    0.31     30     30
normal    0     3.30        0    0.00     --     --     --
normal    0     4.40        0    0.00     --     --     --
normal    0     5.50        0    0.00     --     --     --
normal    0     8.25        0    0.00     --     --     --
normal    0    11.00        0    0.00     --     --     --
normal    0    16.50        0    0.00     --     --     --
normal    0    22.00        0    0.00     --     --     --
normal    0    34.65        0    0.00     --     --     --
 BSC:BSC4TRE  BTS:8HERMIA3A (8)  BCF:1800_3Ail (3)

            Distance            Share
               upper               in min    max    ave
TRX     EXT    range  Freq of   range power  power  power
type   (km)     (km)  reports     (%) (dBm)  (dBm)  (dBm)
------ ---- -------- -------- ------- ------ ------ ------
normal    0     1.10     6732  100.00      2     30
normal    0     2.20        0    0.00     --     --     --
normal    0     3.30        0    0.00     --     --     --
normal    0     4.40        0    0.00     --     --     --
normal    0     5.50        0    0.00     --     --     --
normal    0     8.25        0    0.00     --     --     --
normal    0    11.00        0    0.00     --     --     --
normal    0    16.50        0    0.00     --     --     --
normal    0    22.00        0    0.00     --     --     --
normal    0    34.65        0    0.00     --     --     --
 BSC:BSC4TRE  BTS:1HERMIA3C (1)  BCF:1800_3Cil (1)
```

Figure 189. Report 232: Distance range distribution per cell

23.5.3 Distance range distribution on BTS level

The report **Cell analyser** (216) provides you with the distribution of measurements in distance ranges and power classes.

TRX type	Distance upper range (km)	Freq of reports	Share (%)	min power (dBm)	max power (dBm)	ave power (dBm)
normal	1.10	49032	100.00	24	30	27
normal	2.20	0	0.00	--	--	--
normal	3.30	0	0.00	--	--	--
normal	4.40	0	0.00	--	--	--
normal	5.50	0	0.00	--	--	--
normal	8.25	0	0.00	--	--	--
normal	11.00	0	0.00	--	--	--
normal	16.50	0	0.00	--	--	--
normal	22.00	0	0.00	--	--	--
normal	34.65	0	0.00	--	--	--

Figure 190. Distance range distribution on the BTS level as shown in report 216, Cell analyser.

The report **Cell doctor** (213) shows you the percentage distribution of measurements in distance ranges and power classes in chronological order. Normally the measurement is set for the 24-hour or 12-hour reporting interval due to heavy load on Nokia NetAct and therefore the time resolution is usually only slightly better than in the report **Cell analyser** (216).

23.6 Handover cause

BSS Network Doctor provides a set of reports for investigating handover cause at various network levels.

23.6.1 Handover cause on area level

For handover causes on the area level, run the report **Network benchmark statistics** (204).

```
Causes:
UL quality..................................../c4023           9  (   1.28 %)
UL level....................................../c4024         107  (  15.22 %)
DL quality..................................../c4025          38  (   5.41 %)
DL level....................................../c4026         174  (  24.75 %)
Distance ...................................../c4027           0  (   0.00 %)
MSC invocation (traffic reason) ............../c4028           0  (   0.00 %)
UL interference ............................../c4029          17  (   2.42 %)
DL interference ............................../c4030         188  (  26.74 %)
Umbrella ...................................../c4031           0  (   0.00 %)
Pbdgt ......................................../c4032         170  (  24.18 %)
OMC (forced by user) ........................./c4033           0  (   0.00 %)
Directed retry .............................../c4079           0  (   0.00 %)
Pre-emption ................................../c4086           0  (   0.00 %)
Rapid field drop ............................./c4087           0  (   0.00 %)
Low distance ................................./c4088           0  (   0.00 %)
Bad CI ......................................./c4089           0  (   0.00 %)
Good CI ....................................../c4090           0  (   0.00 %)
```

```
Aif circuit type change (S5).................../c4099           0  (   0.00 %)
Slow moving MS (S5) ........................../c4091           0  (   0.00 %)
MS slow speed (S6) ........................../c4105           0  (   0.00 %)
MS high speed (S6) ........................../c4106           0  (   0.00 %)
Bad rxlev on super (S7)...................../c4109           0  (   0.00 %)
Good rxlev on reg (S7)....................../c4110           0  (   0.00 %)
Direct access (S7).........................../c4128           0  (   0.00 %)
Enhanced rapid field drop (S7).............../c4111           0  (   0.00 %)
BSC controlled TRHO (S8)..................../c4035           0  (   0.00 %)
DADLB (S8)................................../c4129           0  (   0.00 %)
GPRS (S9).................................../c4130           0  (   0.00 %)
HSCSD (S10)................................./c4141           0  (   0.00 %)

Note: For a cell level list, run report 154.
```

Figure 191. Area level data on handover causes in report 204, Network benchmark statistics.

23.6.2 Handover cause on BTS hit list

For handover causes on the BTS hit list, run the report **HO attempt cause distribution by cells** (154).

```
===============================================================================
=
=                   HO ATTEMPT CAUSE DISTRIBUTION BY CELLS
=
=                   Network:            PLMN
=                   Area:               All BTSs selected
=                   Period:             from 20020415 to 20020415
=                   Sorting:            by Nbr of HO
=                   Special terms:
=
===============================================================================

The cells are listed in the order of selected cause. Value '0' in all columns
means that there has been no handovers.

The distribution (%) of HO attempts by causes are shown for each cell:
UL qua          /c4023          UL quality
UL lev          /c4024          UL level
UL itf          /c4029          Uplink interference
DL qua          /c4025          Downlink quality
DL lev          /c4026          Downlink level
DL itf          /c4030          Downlink interference
Dist high       /c4027          Distance exeeds limit
Dist low        /c4088          Low distance (S4)
MSC             /c4028          MSC invocation (traffic reason)
Umbr            /c4031          Umbrella
OMC             /c4033          Operation and maintenance (forced by user)
Pbgt            /c4032          Power Budget
DR              /c4079          Directed retry
RFD             /c4087          Rapid field drop (S4)
ERFD            /c4111          Enhanced Rapid field drop (S7)
SMM             /c4091          Slow Moving MS (S5)
PrEm            /c4086          Pre-emption (S3)
CI Bad          /c4089          Bad C/I ratio (S4)
CI Good         /c4090          Good C/I ratio (S4)
MS spee slow    /c4105          Slow speed of MS (S6)
MS spee high    /c4106          High speed of MS (S6)
TRHO            /c4035          BSC controlled TRHO (S8)
DADL            /c4129          DADLB (S8)
GPRS            /c4130          HO to enable GPRS territory upgrade (S9)
```

```
CTC             /c4099          HO to change Aif circuit type (S5)
HSCSD           /c4141          Intracell HO attempt for a single slot call
.                               for enabling upgrade for an HSCSD call (S10)
Nbr of HO att  /ho_13f         Number of HO attempts

The numbers are counter references used in Nokia documents.

Measurement used: p_nbsc_ho

===============================================================================


                               Cells by HO cause
                         between 20020415 and 20020415

                  {UL   DL                                        MS
                  ***  ***  Dist                      CI         spee
                  qua  qua  ***  MSC  PBGT            ***        ***  TRHO
BTS               lev  lev  high Umbr DR   PrEm Bad  SMM  slow DADL
 BCF              itf  itf  low  OMC  HSCS RFD  Good ChAd high GPRS Nbr of
 BSC (BTSid)      (%)  (%)  (%)  (%)  (%)  ERFD (%)  CTC( (%)  (%)  HO att
----------------- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ------
74OULUNMP            0    0    0    0   92    0    0    0    0    0     24
 ULTRA OULUNMP       8    0    0    0    0    0    0    0    0    0
 BSC4TRE (74)        0    0         0         0         0         0

11HERMIA3A          17    0    0    0    0    0    0    0    0    0      6
 1900_3Ail          83    0    0    0    0    0    0    0    0    0
 BSC4TRE (11)        0    0         0         0         0         0

3HERMIA3C            0    0    0    0  100    0    0    0    0    0      4
 1800_3Cil           0    0    0    0    0    0    0    0    0    0
 BSC4TRE (3)         0    0         0         0         0         0
```

Figure 192. Report 154: HO attempt cause distribution by cells

23.6.3 Handover cause on BTS level

To obtain the averages for handover causes over the whole period and the busy hour and for the share of each cause, run the report **Cell analyser** (216).

```
===============================================================================
=                          BTS -  HO MEASUREMENT
=              HANDOVER CAUSE (CONT.) AND OTHER HO COUNTERS
=                  BSC4TRE bts id:23  name:23HERMIA3C1KRS
=                   from 20000119 to 20000119
===============================================================================

NOTE: Only hours with HO attempts are shown.

RFD                   c4087    Rapid field drop.
ERFD                  c4111    Enhanced rapid field drop. (S7)
Low dist              c4088    Low distance
Bad CI                c4089    Bad C/I ratio on super-reuse frequency.
Good CI               c4090    Good C/I ratio on super-reuse frequency
Bad lev               c4109    Bad RX level on super-reuse frequency . (S7)
Good lev              c4110    Good RX level on a regular frequency. (S7)
.
Slow MS               c4091    Handover due to the slow moving MS in Macro. (S5)
MS slow speed         c4105    Handover due to the MS slow speed. (S6)
MS high speed         c4106    Handover due to the MS high speed. (S6)
```

```
Adj ID Error          c4100    Adjacent cell ID error when there is wrong
.                              BSS radio network configuration database. (S5)
CTC                   c4099    Handover attemps caused by the changing of
.                              Aif circuit type (S5)
Dir Acc               c4128    Direct access attemps to super reuse TRX. (S7)
HSCSD                 c4141    Intracell handover attempt for a single slot call in

.                              order to enable an upgrade for an HSCSD call (S10)


                                             MS speed
                                             *****      Adj
                   Low Bad CI    Bad  Good slow          ID         Dir
dd hh  RFD ERFD  dist Good CI    lev   lev high      Error  CTC   Acc HSCSD
-- -- ---- ---- ----- ------- ----- ----- -------- ----- ---- ----- -----
15 04    0    0     0       0     0     0        0     0    0     0     0
                            0                    0
```

Figure 193. BTS level data on handover cause in report 216, Cell analyser.

For hourly handover cause counts, run the report **Cell doctor** (213).

```
===============================================================================
=                          BTS -  HO MEASUREMENT
=              HANDOVER CAUSE (CONT.) AND OTHER HO COUNTERS
=                  BSC4TRE bts id:23  name:23HERMIA3C1KRS
=                   from 20000119 to 20000119
===============================================================================

NOTE: Only hours with HO attempts are shown.

RFD                   c4087    Rapid field drop.
ERFD                  c4111    Enhanced rapid field drop. (S7)
Low dist              c4088    Low distance
Bad CI                c4089    Bad C/I ratio on super-reuse frequency.
Good CI               c4090    Good C/I ratio on super-reuse frequency
Bad lev               c4109    Bad RX level on super-reuse frequency . (S7)
Good lev              c4110    Good RX level on a regular frequency. (S7)
.
Slow MS               c4091    Handover due to the slow moving MS in Macro. (S5)
MS slow speed         c4105    Handover due to the MS slow speed. (S6)
MS high speed         c4106    Handover due to the MS high speed. (S6)
Adj ID Error          c4100    Adjacent cell ID error when there is wrong
.                              BSS radio network configuration database. (S5)
CTC                   c4099    Handover attemps caused by the changing of
.                              Aif circuit type (S5)
Dir Acc               c4128    Direct access attemps to super reuse TRX. (S7)
HSCSD                 c4141    Intracell handover attempt for a single slot call in
.                              order to enable an upgrade for an HSCSD call (S10)
```

Figure 194. Hourly handover cause counts in report 213, Cell doctor.

23.7 BSC clear codes

Clear code measurements take place on the BSC level.

23.7.1 BSC clear codes on network level

For BSC clear codes on the network level, run the report **Clear code statistics** (220).

```
===============================================================================
=
=                   CLEAR CODE STATISTICS
=
=                 Network:         PLMN
=                 BSC:             All BSCs
=                 Period:          from 19970819 to 19970830
=
===============================================================================

This report displays for the selected BSC:
- The number of calls per a clear code counter
- The number of calls per phase and clear code.

Running this report takes a moment. Wait please.

===============================================================================

-
===============================================================================
=                            Clear Codes
=                 from 19970819 to 19970830
===============================================================================

This report gives the sums for each clear code over the network.
Please refer to the Nokia NetAct database description if the counter description
is missing.

Measurement used: p_nbsc_cc, p_nbsc_cc_pm

===============================================================================



                                            Nbr of    Share
Counter Description                          calls        %
------- ---------------------------- ---------- --------
      1 External HO source failures          27    0.000
      3 Internal inter HO failures        29808    0.018
      4 Internal intra HO failures        11856    0.007
      5 Call failures                    557481    0.340
      6 Setup failures                   488470    0.298
      7 Dropped calls                    110702    0.067
      8 TCH fails                        614018    0.374
     11 Ext.HO source succ.             1206294    0.735
     12 Ext.HO target succ.             1206090    0.735
     13 Int. inter HO succ.             7908879    4.819
     14 Int. intra HO succ.             1323225    0.806
     15 Call succ                      27172019   16.556
     16 Setup succ                     27096737   16.511
     17 Conversation started            9058877    5.520
     18 TCH seizures                   21901001   13.345
     25 Location update attempts       12134240    7.394
     26 Location updates               11998525    7.311
     28 FACCH emerg.call                      2    0.000
     35 Emergency call attempts            5498    0.003
     36 Re-establishment attempts         40057    0.024
     37 Answers to paging attempts      3451560    2.103
     38 MO speech call attempts         8717360    5.312
     39 Other procedure attempts        2266508    1.381
     41 Basic emerg.call                   4883    0.003
     43 Basic answer to paging          3324202    2.026
```

```
     44 Basic MO speech call            8385665    5.110
     45 Basic MO data call                 2984    0.002
     46 Basic other procedure           2265780    1.381
     47 Basic MT data call                  461    0.000
     59 Inc. ext. HO directed retry        1971    0.001
     60 Inc.ext.HO, unexpected          1187546    0.724
     74 Ext.inc.HO, DR                     2004    0.001
     75 Ext.inc.HO unexpected           1204086    0.734
     81 Ext.outg.HO, DL Rx lev           151545    0.092
     82 Ext.outg.HO, UL Rx lev           248105    0.151
     83 Ext.outg.HO, DL Rx qual          185222    0.113
     84 Ext.outg.HO, UL Rx qual           83021    0.051
     85 Ext.outg HO, DL interference      95709    0.058
     86 Ext.outg.HO, UL interference      12159    0.007
     88 Ext.outg.HO, pbgt                426189    0.260
     89 Ext.outg.HO, umbrella               289    0.000
     90 Ext.outg.HO, forced                  17    0.000
     91 Ext.outg.HO, DR                    1955    0.001
     95 Ext.outg.HO, rapid field drop      2083    0.001
    101 Int HO DL Rx Lev succ            941854    0.574
    102 Int HO UL Rx Lev succ           1473756    0.898
    103 Int HO DL Rx Qual succ           787665    0.480
    104 Int HO UL Rx Qual succ           424677    0.259


                                         Nbr of    Share
Counter Description                       calls        %
------- ------------------------------ ---------- --------
    105 Int HO DL Interf succ            505831    0.308
    106 Int HO UL Interf succ             88461    0.054
    108 Int HO PBGT succ                3191118    1.944
    109 Int HO Umbrella succ              35500    0.022
    110 Int HO Forced succ                  166    0.000
    111 Int HO DR succ                    18786    0.011
    115 Int HO rapid field succ            2329    0.001
    121 Int HO DL interference succ      595457    0.363
    122 Int HO UL interference succ      594824    0.362

-
===============================================================================
=                        Phases and Clear Codes
=                 from 19970819 to 19970830
===============================================================================

This report gives the sums for pair of phase and clear code over the network.

Measurement used: p_nbsc_cc

Call Phase              Call phase (see Appendix E of NMS dbase description)
Clear code id           BSC clear code identification

Measurement needed: p_nbsc_cc.

===============================================================================


 Call Call                     Clear
phase phase                     Code
 code descr                       id     Count
----- ------------------------ ----- ---------
    1 Paging/initial MS            0         1
                                   2         2
                                   4         2
                                   7         2
                                  12        11
                                  14       110
```

```
                                     17        18
                                     21    911307
                                     40     32976
                                     42         2
                                     44       676
                                     48     35810
                                     52        29
   2 MM-signalling                    0        14
                                      2        15
                                      3        74
                                      4         4
                                      7         2
                                     17     42061
                                     18      4110
                                     20     48708
                                     21         7
                                     27        21
                                     34     52929
                                     36       404
                                     39         4
                                     42         1
                                     43        34
                                     50         6
                                     86       207
                                     87     66177
                                     88       468
                                     89         5
                                    135         9
                                    141        11
                                    185         1
   3 Basic asignment                  2         1
                                      3         2
                                      4         1
                                      6     56796
                                      7         2
                                     12        13
                                     14        28
                                     17        42
                                     18        67
                                     20        35
                                     21     22180
```

Figure 195. Report 220: Clear code statistics

23.7.2 BSC clear codes on BSC level

The **BSC doctor** (212) report is similar to the report above.

23.7.3 Cell analyzer

The **Cell analyzer** (216) shows detailed and versatile information about a cell related to its behaviour. This is the prime report to troubleshoot a cell.

23.8 Troubleshooting

Normally the troubleshooting is initiated by an alarm which then can be used for diagnostics.

Yet, there are many abnormal situations which do not trigger an alarm. To spot the BTSs suspected, BSS Network Doctor provides a variety of BTS hit list reports. Following is a list of some of the more important ones:

- **Cells by call success ratio** (250)

  to change the focus from SDCCH to TCH and from access to success using different sorting keys. See chapter Chapter 9 for a model.

- **Cells having high TCH drop call ratio** (163)

  to spot TCH drop problems and to see directly the distribution to failure types. For a model report, see chapter Chapter 7.

- **UL and DL quality and UL interference per TRX, 24-hour/10-day breakdowns** (196) and

  UL and DL quality per TRX (197)

  to spot problems in UL or DL quality per TRX. See chapter Section 23.1.2.1 for model reports.

- **Cells having UL interference, 24-hour/10-day breakdowns** (190)

  For a model report, see chapter Chapter 12.

- **Adjacencies having high HO failure ratio** (153)

  A model report is shown under chapter Section 7.3.3.

- **SDCCH drop ratio per cell** (166)

  to spot SDCCH drop problems and to see directly the distribution to failure types. For a model report, see chapter Chapter 7.

- **Cells having most delete indications** (202)

  to spot access grant (AG) buffer overflow.

You can also use the following reports:

- **Cells having SMS establishment failures** (132)
- **Cells having RACH rejections** (134)
- **Cells having high HO attempts/call ratio** (157)
- **Transcoder failures** (164)

- **Cells having high drop call count in handovers** (167)
- **Low traffic cell check-up** (183)

In the **Low traffic cell check-up** (183) report the cells are analysed to find out the number of hours when the following condition is fulfilled:

- (SDCCH_SEIZ_ATT=0) OR
- (SDCCH_ASSIGN=0) OR
- (TCH_HO_SEIZ=0 AND TCH_NORM_SEIZ>0) OR
- (TCH_NORM_SEIZ=0 AND TCH_HO_SEIZ>0)

The condition means that the hour is counted if there are no SDCCH seizure attempts or assignments or there are only HO bids or only call bids. If there are many hours reported for a cell and the bid amounts are high in the column with non-zero value, the case should be investigated using BSS Network Doctor, for example. A barred cell, for instance, gives zeros for all supervised counters.

```
================================================================================

                                Low traffic cells
                  between 19991117 and 19991117 in PLMN network

                                                                   Hours
                                   SDCCH                   TCH    TCH  with BCF
BSC Name          BCF Name          seiz  SDCCH    TCH    norm     HO cond. ADM
(BTS id)          BTS Name           att assign    req    seiz   seiz  true ST
----------------- --------------- ------ ------ ------ ------ ------ ----- ----
BSC1KUTOJA        KUTOJA001            0      0      0      0      0     9 U
(1)               KUTOJA1001

BSC1KUTOJA        SUOSAA004            0      0      0      0      0     9 U
(7)

BSC1KUTOJA        SANDPD010            0      0      0      0      0     9 U
(20)              SANDPD1020
```

Figure 196. Report 183: Low traffic cell check-up

The **Transcoder failures** (164) report shows the sums of failures counted over the given time period.

```
================================================================================


                                                      TC      TC
                                                    flrs    flrs
                                                   in HO   in HO    TCH    TCH
BSC           BTS name                BTS   TC        on      on   norm     HO
(BTS id)      BCF name                NBR flrs old TCH new TCH   seiz   seiz
------------- ---------------------- ---- ---- ------- ------- ------ ------
```

```
BSC1KUTOJA    KILO1012                    12    1       0       0      31      28
(12)          KILO007
```

Figure 197. Report 164: Transcoder failures

The **Cells having RACH rejections** (134) report gives the following figures sorted out by the selected column for all cells meeting the thresholds:

```
===============================================================================
=
=                   CELLS HAVING RACH REJECTIONS
=
=                   Network:   PLMN
=                   Area:      Area XX
=                   Period:    from 20010502 to 20010502
=                   Threshold: Total rejections % >= 1
=                   Sorted by: Channel required msg rcvd
=
===============================================================================

The report gives the following figures sorted by the selected column
for all cells meeting the thresholds. For rejections both % value and absolute
sum are counted. The % values are counted in ratio to counter
c3004 (Channel required msg rcvd).

Distance                        c3031   Related to BSS feature BSS5280
.                                       Distance Checking.
Illegal estab. cause           rach_6   These are actual ghost accesses that
.                                       are detected before SDCCH seizure based
.                                       on illegal establishment cause.
BCSU MCMU prot                 /c3041   RACH deleted by BSCU for MCMU
.                                       protection. There can be max.20
.                                       simult. requests per CCCH to MCMU.
BCSU lower limit               /c3039   Refused accesses (excluding emercency
.                                       calls,MOC,MTC) when BCSU load exceeds
.                                       lower limit.
BCSU upper limit.              /c3040   Accesses (all) refused when BCSU load
.                                       exceeds upper limit (53
unhandled msgs).
Channel required msg rcvd      /c3004   Nbr of channel required messages
.                                       received
Total RACH rejection (%)      /rach_7   Ratio of all rejections to ch.requests

Measurement used: p_nbsc_res_access

Note: Running this report takes a while. Patience please.

===============================================================================

                          Cells having RACH rejections
                          between 20010502 and 20010502

                           Illegal BCSU    BCSU    BCSU
                           estab.  lower   upper   MCMU          Total
                  Distance cause   limit   limit   prot           RACH
BTS               *****    *****   *****   *****   *****     rejection   Channel
 BCF              (%)      (%)     (%)     (%)     (%)           ratio  required
 BSC (BTSid)      nbr      nbr     nbr     nbr     nbr             (%)  msg rcvd
----------------- -------- ------- ------- ------- ------- --------- ---------
INSITE                 0.0    34.8     0.0     0.0     0.0      34.8        89
 LAB2 INSITE             0      31       0       0       0
 BSC MERKURIUS (1
00)
```

```
KIILA03                 0.0     1.6     0.0     0.0     0.0         1.6         63
 KIILA001                 0       1       0       0       0
 BSC7SALO (3) 5
```

Figure 198. Report 134: Cells having RACH rejections

The **Cells having high HO attempts/call ratio** (157) report shows for each cell:

- HO/calls ratio (%)
- Number of handovers
- Number of calls

```
================================================================================

                   Cells having highest HO attempts/call ratio
                          between 19990907 and 19990907

                                                                HO/Calls
BSC             BCF Name            Number of Number of      Ratio
(BTS id)        BTS Name            Handovers     Calls        (%)
--------------- ------------------- --------- --------- ----------
BSC3TRE         KANTA2KRS2                  6         1      600.0
(4)             KANTA2KRS2

BSC1KUTOJA      KUTOJA001                   0         0   No calls
(1)             KUTOJA1001

BSC1KUTOJA      KUTOJA001                   0         0   No calls
(2)             KUTOJA1002
```

Figure 199. Report 157: Cells having high HO attempts/call ratio

The **Cells having high drop call count in handovers** (167) report lists all cells having drop calls in handovers more than the given threshold. The distribution of drop calls is given for each cell.

```
================================================================================

            Cells having high drop call count in intra BSC handovers
                          between 19991107 and 19991116

                                                                 Intra     Total
            BTS NAME                      HO   BSC i   BSC o    cell intra BSC
BSC         BCF NAME                     att   HO DC   HO DC   HO DC     HO DC
----------- ------------------------ ------- ------- ------- ------- ---------
BSC4TRE     7HERMIA3A                    817       1       6      17        24
(7)         1800_3Ail

BSC4TRE     3HERMIA3C                    508       6       1       2         9
(3)         1800_3Cil
```

```
BSC2UPS1    1UPS2004                        32       3       0       0         3
(4)         1UPS002
```

Figure 200. Report 167: Cells having high drop call count in handovers

The **Cells having SMS establishment failures** (132) report shows cells having SMS establishment failures over a given period.

```
===============================================================================

                    Cells having SMS establishment failures
                         between 19970201 and 19970210

                                              Nbr of SMS flr  SMS flr     Tot
BSC             BCF name                    SMS est.       %        % SMS flr
BTS id          BTS name                    attempts  on TCH on SDCCH       %
--------------- -------------------- -------- ------- -------- -------
BSC_EAST1       LKPWW                            236     .00     3.13    1.69
(7)             030

BSC_EAST1       LKPQQ                            398     .90      .00     .50
(8)             030

BSC_EAST1       LKPMM                            505     .41      .00     .20
(9)             030
```

Figure 201. Report 132: Cells having SMS establishment failures

23.9 Dual band

For the average distribution of single and dual band MS users, run the report **Network benchmark statistics** (204).

```
TCH dual band
=============

Seizures by single band MS .................../c59002          51   (   1.17 %)
Seizures by dual band MS ..................../c59003         4303   (  98.83 %)

Call time by single band MS (minutes)....../trf_43/60         117   (   4.72 %)
Call time by dual band MS (minutes)......../trf_44/60        2362   (  95.28 %)

Note: All % is in ratio to total sum.
```

Figure 202. Distribution of single and dual band MS users in report 204, Network Benchmark statistics

For the detailed BTS profile, run the report **Cell doctor** (213).

```
         TCH    TCH
      single   dual
        band   band    TCH    TCH
       subsc  subsc single   dual
        hold   hold   band   band
        time   time  subsc  subsc
DD HR  (sec)  (sec)   seiz   seiz
-- -- ------ ------ ------ ------
14 00      0  59646      0     64
```

Figure 203. Single/dual band profile in report 213, Cell doctor.

23.10 HSCSD

23.10.1 HSCSD counters (241)

```
================================================================================
=
=                   HSCSD COUNTERS
=
=                   Network:         PLMN
=                   Area:            All BTSs selected
=                   Period:          from 2001010100 to 2001040412
=
================================================================================

This report gives the sum (or max in case of peak value counter) of all
counters. These figures can used for verifying the KPI formulas or
learning about the basic counter level.
If you need these counter values by hours for a cell, use report 213.

Measurement used: p_nbsc_high_speed_data

================================================================================


*** Counters from p_nbsc_res_avail ***

AVE_HSCSD_USERS_NUMER:             36335
AVE_HSCSD_USERS_DENOM:             11531402

AVE_TCH_HOLD_TIME_HSCSD_NUMER:     182037049
AVE_TCH_HOLD_TIME_HSCSD_DENOM:     73634
trf_58 : AVE TCH HOLD TIME HSCSD:     24.72 sec

AVE_BUSY_TCH_HSCSD_NUMER:          90807
AVE_BUSY_TCH_HSCSD_DENOM:          11531402
trf_59 : AVE BUSY TCH HSCSD:           0.00

PEAK_BUSY_HSCSD (max):             12


*** Counters from p_nbsc_traffic ***

HSCSD_TRANSP_TCH_REQ:              487
HSCSD_TRANSP_TCH_SUCC_SEIZ:        487

HSCSD_REQ_CALL_SETUP:              2629
HSCSD_TCH_SUCC_SEIZ_CALL_SETUP:    2629
HSCSD_CON_REL_DUE_FAIL:            161
```

```
HSCSD_TCH_REQ_HO:                 1439
HSCSD_TCH_SUCC_SEIZ_HO:           1439


*** Counters from p_nbsc_ho ***

INTRA_ATT_HSCSD:                  77
INTRA_SUCC_HSCSD:                 75
INTRA_SUCC_DEC_HSCSD:             6
INTRA_SUCC_INC_HSCSD:             6

BSC_O_ATT_HSCSD:                  1362
BSC_O_SUCC_HSCSD:                 1310

BSC_I_ATT_HSCSD:                  1362
BSC_I_SUCC_HSCSD:                 1310
BSC_I_SUCC_DEC_HSCSD:             18
BSC_I_SUCC_INC_HSCSD:             18

MSC_O_ATT_HSCSD:                  2
MSC_O_SUCC_HSCSD:                 2

MSC_I_ATT_HSCSD:                  0
MSC_I_SUCC_HSCSD:                 0
MSC_I_SUCC_DEC_HSCSD:             0
MSC_I_SUCC_INC_HSCSD:             0


*** Counters from p_nbsc_high_speed_data ***

ONE_TCH_REQ_HSCSD:                0
TWO_TCH_REQ_HSCSD:                2359
THREE_TCH_REQ_HSCSD:              1595
FOUR_TCH_REQ_HSCSD:               0

ONE_TCH_SEIZ_HSCSD:               127
TWO_TCH_SEIZ_HSCSD:               2293
THREE_TCH_SEIZ_HSCSD:             1534
FOUR_TCH_SEIZ_HSCSD:              0

MULTI_TCH_REQ_REJ_HSCSD:          0

ONE_TCH_REQ_TIME_14400/100:              0 sec
TWO_TCH_REQ_TIME_14400/100:         256269 sec
THREE_TCH_REQ_TIME_14400/100:       362822 sec
FOUR_TCH_REQ_TIME_14400/100:             0 sec

ONE_TCH_SEIZ_TIME_14400/100:         14579 sec
TWO_TCH_SEIZ_TIME_14400/100:        250622 sec
THREE_TCH_SEIZ_TIME_14400/100:      353890 sec
FOUR_TCH_SEIZ_TIME_14400/100:            0 sec

ONE_TCH_REQ_TIME_9600/100:               0 sec
TWO_TCH_REQ_TIME_9600/100:           60570 sec
THREE_TCH_REQ_TIME_9600/100:         41950 sec
FOUR_TCH_REQ_TIME_9600/100:              0 sec

ONE_TCH_SEIZ_TIME_9600/100:           8869 sec
TWO_TCH_SEIZ_TIME_9600/100:          58840 sec
THREE_TCH_SEIZ_TIME_9600/100:        34811 sec
FOUR_TCH_SEIZ_TIME_9600/100:             0 sec

TCH_SEIZ_IN_UPGRADE:              0
TCH_REL_DUE_UNSUCC_UPGRADE:       0

TCH_SEIZ_IN_DOWNGRADE:            0
TCH_REL_DUE_SUCC_DOWNGRADE:       0
```

```
REQ_PENDED_SLOTS_IN_UPGRADE:      150
SERVED_PENDED_SLOTS_IN_UPGRADE:   0

ALA_FROM_14400_TO_9600:           55
ALA_FROM_9600_TO_14400:           0

AVE_PEND_TIME_DUE_CONG_NUMER:     0
AVE_PEND_TIME_DUE_CONG_DENOM:     175
trf_63 : AVE PEND.TIME DUE CONG :     0.00 sec

AVE_PEND_TIME_NUMER:              2834502
AVE_PEND_TIME_DENOM:              314
trf_62 : AVE PEND.TIME :             90.27 sec
```

Figure 204. Report 241: HSCSD counters

23.10.2 HSCSD KPIs

```
===============================================================================
=
=              HSCSD KPIs
=
=              Network:            PLMN
=              Area:               All BTSs selected
=              Period:             from 20011002 to 20011002
=              Hours selection:    all hours counted
=              Time aggregation:   whole period
=              Object aggregation: BTS
=
===============================================================================

This report shows the KPIs for HSCSD on BTS or BSC or area level.

The list is sorted by the HSCSD calls.

Measurement used: Traffic, HSCSD

Note: Running this report takes a while. Patience please.
Note: To see raw counters, run report 213 for the BTS concerned.

===============================================================================


             !                     !                    !    !
             !                     !                    !    !
             !                     !                    !    !
             !                     !                    !    !
             !                     !                    !    !
             !                     !                    ! BTS!
BSC          !BCF                  !BTS                 !  id!
-------------!---------------------!--------------------!----!
BSC4TRE      !EGSM_Leo             !18LEONIA            !  18!
BSC4TRE      !EGSM_3Ail            !34HERMIA3AIVHUO     !  34!
BSC2SAPO     !                     !SOPRODCS1           !  30!


       !       !       !        !  HSCSD!  HSCSD!
       !       !       !        !traffic!traffic!
       !       !       !   HSCSD!  split!  split!
  HSCSD!  HSCSD!  HSCSD!main ch.!  *****!  *****!
   call!   call!traffic! traffic!   9600!  14400!
    req!   seiz!  (erl)!   (erl)!    (%)!    (%)!
  c1160!  c1162! trf_57!  trf_60! hsd_49! hsd_50!
```

```
-------!-------!-------!--------!-------!-------!
     20!     20!   0.37!    0.04!   11.0!   89.0!
     13!     13!   0.17!    0.44!    0.0!  100.0!
     11!     11!   0.18!    0.00!    0.0!  100.0!


  14400!  14400!  14400!   14400!14400 !14400 !14400 !14400 !
    req!    req!    req!     req!seiz  !seiz  !seiz  !seiz  !
   time!   time!   time!    time!time  !time  !time  !time  !
  *****!  *****!  *****!   *****!***** !***** !***** !***** !
  1 TCH!  2 TCH!  3 TCH!   4 TCH!1 TCH !2 TCH !3 TCH !4 TCH !
  (min)!  (min)!  (min)!   (min)!  (%) !  (%) !  (%) !  (%) !
 c67009! c67010! c67011! c67012!c67009!c67010!c67011!c67012!
-------!-------!-------!-------!------!------!------!------!
      0!      3!    119!       0!   ---!  1432!    69!   ---!
      0!     75!      3!       0!   ---!   101!    75!   ---!
      0!      0!     55!       0!   ---!   ---!     0!   ---!


   9600!   9600!   9600!    9600!9600  !9600  !9600  !9600  !
    req!    req!    req!     req!seiz  !seiz  !seiz  !seiz  !
   time!   time!   time!    time!time  !time  !time  !time  !
  *****!  *****!  *****!   *****!***** !***** !***** !***** !Truput
  1 TCH!  2 TCH!  3 TCH!   4 TCH!1 TCH !2 TCH !3 TCH !4 TCH ! ratio
  (min)!  (min)!  (min)!   (min)!  (%) !  (%) !  (%) !  (%) !   (%)
 c67013! c67014! c67015! c67016!c67017!c67018!c67019!c67020!hsd_15
-------!-------!-------!-------!------!------!------!------!------
      0!     15!      0!       0!   ---!   100!   ---!   ---! 100.0
      0!      0!      0!       0!   ---!   100!   ---!   ---! 100.0
      0!      0!      0!       0!   ---!   ---!   ---!   ---! 100.0
```

Figure 205. Report 242: HSCSD KPIS

24 Benchmark and analysis

BSS Network Doctor provides several reports that give a cross-section of key performance indicators from a large number of measurement counters and formulas:

- Performance statistics (benchmark) (200)
- Network benchmark statistics (204)
- BTS GSM KPI/PI table, dynamic object and time aggregation (205)
- TRX level GSM KPI/PI table, dynamic time aggregation (206)
- Performance profiles for area, 24-hour/10-day breakdowns (207)
- Cell doctor (213)
- Cell analyser (216)
- Base station site check (221)

Sample extracts of these reports are shown in connection with individual performance indicators all over this document.

WARNING

Because of the load caused on Nokia NetAct we recommend you not to run these reports for a large area when the user load on Nokia NetAct is high. It is a good idea to set the reports run from cronjob for periodic generation.

The quality survey (800) in Quality of service reports provides a set of KPIs that usually are used for networkfollow-up. You can find a more detailed set of KPIs in the benchmark report 204.

24.1 Performance statistics (benchmark) (200)

You can select this report to show data from the following areas:

- object information
- basic parameter settings
- daily performance statistics
- adjacency check

This report is meant primarily for the area level. If you use it on the BTS level, some formulas may not be exactly correct. Use report 216 for BTS. Note that the values for the last day may not be full 24-hour values as for the rest of the days.

Note

You should always check that the data you are analysing is consistent.

24.2 Network benchmark statistics (204)

This report provides versatile information about the selected BTS area.

- objects
- key parameters
- Key Performance Indicators

This report is meant primarily for the area level. If you use it on the BTS level, some formulas may not be exactly correct. Use report 216 for BTS.

Rx Quality and Rx Level Statistics measurements are usually run with a measurement period longer than 60 minutes. Therefore applying Busy Period over them may not succeed and no results are shown.

24.3 Performance profiles for area, 24-hour/10-day breakdowns (207)

This report provides 10-day profiles of the indicators listed below.

- SDCCH availability
- SDCCH usage
- TCH availability
- TCH usage

- TCH traffic
- SDCCH access probability
- SDCCH success ratio
- TCH access probability
- TCH success ratio

24.4 BTS GSM KPI/PI table, dynamic object and time aggregation (205)

The report (205) provides a set of KPIs that usually are used for network follow-up. The default aggregation level is 'BTS/daily' but there are also several other aggregation levels offered to allow drill in and out. Sorting is by SDCCH seizure attempts if time aggregation is total level. Otherwise it is by object names and time.

```
===============================================================================
=
=              BTS GSM KPI/PI table, dynamic object and time aggregation
=
=              Network:            PLMN
=              Area:               BSC -   50264
=              Period:             from 20021229 to 20030117
=              Hours selection:    all hours counted
=              Time aggregation:   whole period
=              Object aggregation: BTS
=              Filter:
=
===============================================================================

This report offers the most practical PIs and KPIs to analyse BTS performance.
The default aggregation level is 'BTS/daily' but there are also several other
aggregation levels offered to allow drill in and out.
With total time aggregation the list is sorted by SDCCH assignments, otherwise
by object names and time.

A filter is offered for you to focus on the most interesting cases of traffic.

Note: ** in column means 'not relevant'.
Note: Some columns are shown only if the object aggregation level is BTS.
Note: The development of this report continues. Feedback is appreciated.

Measurements associated:
p_nbsc_res_avail,p_nbsc_traffic,p_nbsc_ho,p_nbsc_res_access,p_nbsc_service,
p_nbsc_packet_control_unit, p_nbsc_rx_qual, p_nbsc_high_speed_data,
p_nbsc_fer

Note: Time aggregation 'measurement period' works correctly only if all measurement
s
have been set up with the same measurement period.

===============================================================================
          !     !             !   !                 !     !              !    !
          !     !             !   !                 !     !              !    !
          !     !             !   !                 !     !              !    !
          !     !             !   !                 !     !              !    !
```

```
         !     !             !   !                !     !                !    !
         !BSC  !             !BCF!                !  SEG!                ! BTS!
BSC      !id   !BCF          ! id!Segment         !   id!BTS             !  id!
---------!-----!-------------!---!----------------!-----!----------------!----!
BSC1KUTOJA!50264!BSC1KUTOJA   !9  !SATERI275       !   27!SATERI275       !  27!
BSC1KUTOJA!50264!BSC1KUTOJA   !53 !56BOCHUM1900    !   56!56BOCHUM1900    !  56!
BSC1KUTOJA!50264!BSC1KUTOJA   !53 !850BOCHUM53     !   53!850BOCHUM53     !  53!
BSC1KUTOJA!50264!BSC1KUTOJA   !53 !57BOCHUM1900    !   57!57BOCHUM1900    !  57!
BSC1KUTOJA!50264!BSC1KUTOJA   !8  !KKALLIO192      !   15!KKALLIO192      !  15!


         !         !        !        !       !        !        !        !
         !         !        !        ! SDCCH!   SDCCH!        !        !
  CCCH CS!  CCCH PS!        !        !traffic! traffic!   SDCCH!        !
  *******!  *******!   SDCCH!capacity! ******!  ******!    hold!     Que!
   ch req!   packet!  1====!====2   !   peak!     ave!    time!    time!
  msg rec!   ch req! unavail!   avail!  (erl)!   (erl)!   (sec)!   (sec)!
    c3004!   c72082!   c2038!   ava_3! trf_28!  trf_45!   trf_4!   c1020!
---------!---------!--------!--------!-------!--------!--------!--------!
     8968!     3680!     0.0!     4.0!    8.0!    0.05!    6.53!    0.00!
     6950!     1529!     0.0!     4.0!    5.0!    0.02!    2.80!    0.00!
     6760!     2259!     0.0!     3.0!    8.0!    0.02!    3.42!    0.00!
     5298!     1129!     0.0!     4.0!   20.0!    0.01!    3.25!    0.00!
     4521!         !     0.0!     7.0!   15.0!    0.01!    3.69!    0.00!


         !         !         !           !         !          !        !
         !         !         !           !         !          !     ===!
    SDCCH!         !         !      SDCCH!    SDCCH!     SDCCH!    1===!
  DYNAMIC!    SDCCH!    SDCCH!    Congest!     seiz!      seiz!T3101   !
   RECONF!     SEIZ!     BUSY!       time!  *******!   *******!expired !
      ATT!      ATT!      ATT!      (sec)!  HO seiz!imm.assign!(%)     !
    c1154!    c1000!    c1001!     cngt_2!    c1006!     c1007!c57020  !
---------!---------!---------!-----------!---------!----------!--------!
        7!     8959!        0!        0.0!        0!      8959!   0.9  !
        1!     6910!        0!        0.0!        0!      6910!   2.0  !
       43!     6560!        0!        0.0!        0!      6560!   4.3  !
      169!     5140!        0!        0.9!        0!      5140!  84.4  !
       18!     4361!       69!        9.9!        0!      4292!   3.0  !


        !        !        !        !        !         !        !    ====!== Ext.!
========!===SDCCH!seizures!========!====    !         !        !    ====!== Ext.!
====2===!====3===!====4===!====5===!====6   !     TCH!capacity!   =TCH!on ext !
location!short   !supplem.!IMSI    !voice   !  1====!====2    !   1===!===2===!
updates !messages!services!detach  !calls   ! unavail!   avail!unavail!CS HR  !
(%)     !(%)     !(%)     !(%)     !(%)     !   (tsl)!   (tsl)!(tsl)  !(tsl)  !
c3019   !sms_5   !c3044   !c3033   !trf_91  ! uav_11a! ava_25a!uav_14 !ava_31 !
--------!--------!--------!--------!--------!--------!--------!-------!-------!
  22.8  !   0.0  !   0.0  !   0.3  !  76.1  !     0.0!    15.0!  **   !  **   !
  20.7  !   1.5  !   0.2  !   3.7  !  72.1  !     0.1!    14.9!  **   !  **   !
  59.8  !   5.7  !   0.6  !   7.7  !  24.7  !     0.1!    14.9!  **   !  **   !
  12.5  !   0.7  !   0.0  !   0.9  !   1.7  !     0.1!    14.9!  **   !  **   !
  78.1  !   0.0  !   0.0  !   0.1  !  22.5  !     0.1!    14.0!  **   !  **   !


       !       !         !         !         !         !         !         !
cells  !====   !   ======!=========!==== All ! cells ==!=========!======   !
TRXs ==!====   !   ======!======TCH!on normal!TRXs ====!=========!======   !
===3===!===4   !    1====!====2====!====3====!====4====!====5====!====6    !
CS FR  !CS dual!  unavail!   CS HR!    CS FR!  CS dual! PS deflt! PS dedic!
(tsl)  !(tsl)  !    (tsl)!    (tsl)!    (tsl)!    (tsl)!    (tsl)!    (tsl)!
ava_33 !ava_35 !   uav_13!   ava_30!   ava_32!   ava_34!  ava_26a!  ava_17a!
-------!-------!---------!---------!---------!---------!---------!---------!
  **   !  **   !      0.0!      0.0!      9.0!      0.0!      5.0!      1.0!
  **   !  **   !      0.1!      0.0!     10.9!      0.0!      3.0!      1.0!
  **   !  **   !      0.1!      0.0!      8.0!      0.0!      3.0!      4.0!
  **   !  **   !      0.1!      0.0!     10.9!      0.0!      3.0!      1.0!
```

```
  **   !  **   !      0.1!      0.0!      0.0!     14.0!      0.0!      0.0!

       !       !       !       !          !          !       !       !
    ===!CS TCH !traffic!====   !      Sum!       Sum! PS TCH! PS TCH!
   1===!===2===!===3===!===4   !    CS TCH!    PS TCH!traffic!traffic!
 single! single!  HSCSD!  HSCSD!   traffic!   traffic!*******!*******!
   FTCH!   HTCH!main ch!  subch!   *******!   *******!    UL!     DL!
  (erl)!  (erl)!  (erl)!  (erl)!  (erl hr)!  (erl hr)!  (erl)!  (erl)!
trf_106!trf_101!trf_60a!trf_92a!   trf_24c!   trf_95a!trf_78a!trf_79a!
-------!-------!-------!-------!----------!----------!-------!-------!
  0.003!  0.000!  0.000!  0.000!      1.17!     12.47!    0.0!    0.0!
  0.154!  0.000!  0.000!  0.000!     49.05!      2.09!    0.0!    0.0!
  0.046!  0.000!  0.000!  0.000!     14.75!      2.57!    0.0!    0.0!
  0.004!  0.000!  0.000!  0.000!      1.36!      0.16!    0.0!    0.0!
  0.001!  0.000!  0.000!  0.000!      0.47!          ! ----- ! ----- !

         !         !         !         !      MS!       !       !
         !         !         !         !    TCH!       !TCH    !
         !         !         !         !   SUCC!       !drops  !
    =====!==TCH new! calls===!=====    !   SEIZ!TCH    !after  !
    1====!====2====!====3====!====4    !  ASSIGN!drops  !assign !
      FCS!    DR in!   normal!   DR out!   CMPLT!per erl!(%)    !
    c1099!     dr_4!   trf_55!     dr_3!   c1148!dcr_10b!dcr_8b !
---------!---------!---------!---------!---------!-------!-------!
        0!        0!       24!        0!       24!  0.00!   0.00!
        0!        0!     4968!        0!     4962!  0.71!   0.78!
        0!        0!     1494!        0!     1477!  5.97!   5.32!
        0!        0!       87!        0!       80!  7.33!   8.97!
        0!        0!        3!        0!        3!  0.00!   0.00!

      !      !      !      !      !      !      !
Qual  !Qual  !Qual  !Qual  !Qual  !Qual  !      !
UL    !DL    !UL    !UL    !DL    !DL    !UL    !
FER   !FEP   !BER   !BER   !BER   !BER   !intrf !
q0..5 !q0..5 !q0..4 !q0..5 !q0..4 !q0..5 !******!
(%)   !(%)   !(%)   !(%)   !(%)   !(%)   !(%)   !
ulq_3 !dlq_3 !ulq_2 !ulq_2 !dlq_2 !dlq_2 !itf_1 !
------!------!------!------!------!------!------!
  98.2!----- !  97.5!  98.8!  89.9!  94.5!   0.0!
  97.9!  99.9!  95.7!  99.5!  99.5!  99.5!   0.0!
  96.8!----- !  95.9!  97.1!  96.9!  97.4!   0.0!
  98.1! 100.0!  82.1!  89.0!  97.3!  97.6!   0.3!
----- !----- ! 100.0! 100.0! 100.0! 100.0!   0.0!

       !       !       !       !       !       !       !       !
   ====!===Call!success!factors!====   !       !       !       !Intra
  1====!===2===!===3===!===4===!===5   !       !HO     !HO     !cell
SDCCH  !SDCCH  !SDCCH  !TCH    !TCH    !HO/call!succ   !drop   !HO
access !success!success!access !success!****** !****** !****** !******
(%)    !(%)    !(%)    !(%)    !(%)    !(%)    !(%)    !(%)    !(%)
csf_1a !csf_2e !csf_2n !csf_3l !csf_4v !trf_13e!hfr_1  !hfr_68 !ho_48
-------!-------!-------!-------!-------!-------!-------!-------!-------
 100.00!  98.28!   0.35! 100.00! 100.00!    0.0! 100.0 !   0.0 !   4.17
 100.00!  97.91!  99.66! 100.00!  99.30!    0.7!  66.9 !   0.8 !   1.33
 100.00!  95.51!  92.34! 100.00!  94.11!    2.9!  82.7 !   0.7 !  10.71
 100.00!  95.57!  97.75! 100.00!  88.51!   87.4!  68.2 !   0.0 !   1.15
  98.42!  95.35! ------! 100.00! 100.00! ------! ------! ------! ------
```

Figure 206. Report 205: BTS GSM KPI/PI table, dynamic object and time aggregation

24.5 TRX level GSM KPI/PI table, dynamic time aggregation (206)

The report (206) shows the PIs and KPIs that arer useful on TRX level analysis. Time aggregation level can be chosen.

```
===============================================================================
=
=              TRX LEVEL GSM KPI/=             PI TABLE, DYNAMIC TIME AND OBJECT A
GGREGATION
=
=              Network:            PLMN
=              Area:               All BTSs selected
=              Period:             from 20020603 to 20020603
=              Hours selection:    all hours counted
=              Time aggregation:   whole period
=
===============================================================================

This report shows the PIs and KPIs that are useful at least on TRX level.
You can select time and object aggregation level (the most detailed level
being TRX).
On BTS summary level the list is sorted by traffic (number of UL call samples),
otherwise by object names and time.

TRX type indicates if there are extended or normal TRXs.The value 'chngd'
means that there are both 'extended' and 'normal' values within the period.

Measurements associated:
p_nbsc_res_access, p_nbsc_power, p_nbsc_rx_qual (TRX level measurements)

Note: Time aggregation 'measurement period' works correctly only if all
measurements are set up with the same measurement period.

===============================================================================
              !     !                        !   !                    !    !
              !     !                        !   !                    !    !
              !     !                        !   !                    !    !
              !     !                        !   !                    !    !
              !BSC  !                        !BCF!                    ! BTS!
BSC           !id   !BCF                     ! id!BTS                 !  id!
--------------!-----!------------------------!---!--------------------!----!
BSC MERKURIUS2!85521!Ultrasite Q1=70         !100!130TKLAB            ! 130!
BSC MERKURIUS2!85521!69ErjantiTL             !69 !ERJANTITL           !  69!
BSC MERKURIUS2!85521!68ErjantiTL             !68 !ERJANTITL1          !  68!
BSC MERKURIUS2!85521!InsiteMerkurius         !2  !INSITE              ! 100!
BSC MERKURIUS2!85521!1                       !40 !INSITE1             !  81!


          !       !         !          !          !          !          !     !
          !       !         !          !          !          !          !     !
          !       !         !          !     Voice!          !          !UL   !
          !       !   Radius!        LU!     calls!       SMS!    Re_est!Intrf!
          !TRX    !extension!  on SDCCH!  on SDCCH!  on SDCCH!  on SDCCH!level!
    TRX_ID!type   !     (km)!     c3019!    trf_93!     sms_5!     c3020!itf_4!
----------!-------!---------!----------!----------!----------!----------!-----!
         1!normal !        0!        26!         0!         0!         0!  1.0!
         1!normal !        0!         0!         0!         0!         0!  1.0!
         1!normal !        0!         0!         0!         0!         0!  1.0!
         1!normal !        0!         0!         0!         0!         0!  1.0!
         1!normal !        0!         3!         0!         2!         0!  1.0!


Qual  !Qual  !Qual  !Qual  !Qual  !Qual  !      !     !
UL    !DL    !UL    !UL    !DL    !DL    !      !     !
```

```
FER   !FEP   !BER   !BER   !BER   !BER   !Max   !     !
q0..5 !q0..5 !q0..4 !q0..5 !q0..4 !q0..5 !Distan!Link !
(%)   !(%)   !(%)   !(%)   !(%)   !(%)   !(m)   !imbal!
ulq_3 !dlq_3 !ulq_2 !ulq_2 !dlq_2 !dlq_2 !c5022 !lb_13!
------!------!------!------!------!------!------!-----!
----- !----- !----- !----- !----- !----- !----- !---- !
----- !----- !----- !----- !----- !----- !----- !---- !
----- !----- !----- !----- !----- !----- !----- !---- !
----- !----- !----- !----- !----- !----- !----- !---- !
----- !----- !----- !----- !----- !----- !----- !---- !


           !          !       !          !
           !          !       !    {Voice!     Voice
        TCH!          !       !    smpls!      smpls
       Call!    Period!       !       UL!         UL
      hours!  measured!CS Traf!    normal!        AMR
    trf_119!      (hr)!  (erl)!   trf_113!   trf_114
-----------!----------!-------!----------!----------
       0.00!          !       !          !
       0.00!          !       !          !
       0.00!          !       !          !
       0.00!          !       !          !
       0.00!          !       !          !
```

Figure 207. Report 206: TRX level GSM KPI/PI table, dynamic time aggregation

24.6 Cell doctor (213)

This report is used to see the details of a BTS on a periodical basis for all counters and also the alarms and parameters across the selected period. Use this information to correlate the events and to make the diagnosis.

24.7 Cell analyser (216)

This report shows detailed and versatile information about a cell in relation to its behaviour. This is the prime report for troubleshooting a cell.

The output can be limited to a part of the report:

1. Configuration of the BTS
2. Performance of the BTS
3. The following 10-day/24-hour charts are produced for the selected BTS:
   - Peak RACH load (rach_3)
   - Average RACH load (rach_5)
   - SDCCH congestion (cngt_2)
   - SDCCH blocking (blck_5)
   - Delete indication msgs

- SDCCH to TCH access success ratio (csf_2i)
- TCH call blocking (blck_8b)
- Average available TCH (ava_28,ava_29)
- Peak busy TCH (trf_19)
- TCH traffic (trf_12a)
- UL calls in q0-q5 (ulq_2)
- DL calls in q0-q5 (dlq_2)
- SDCCH congestion (cngt_2)
- BTS UL (idle TCH) Interference (itf_1)
- Average band of TCH Interference (itf_4)
- TCH drop-out ratio (dcr_10)
- HO failure ratio ratio (hfr_1)
- Normal call seizures on TCH
- DR calls (dr_4)
- DR to other cells (dr_3)
- HO seizures on TCH (ho_15)
- Calls dropped in handovers (dcf_6)
- Successful SDCCH seizures for location updating (lu_1)
- Minimum paging buffer (pgn_2)

4. The following checks are executed for the selected BTS:

- Adjacencies to cells with different LAC (LU affecting)
- Adjacency discrepancies (HO failure affecting)
- Non-symmetrical adjacencies (drop call affecting)
- Adjacent cell frequencies same or f+1 or f-1
- Adjacent cell frequencies same and BSIC same
- Two adjacent cells with same frequencyAdjacency synchronisationAdjacencies with HO failure ratio % exceeding 10%
- A Non unique LAc, CI

24.8 Base station site check (221)

This report allows you to make a quick health check of all cells under the selected BCF. It displays a set of KPIs together with information on alarms, configuration and the administrative state.

```
===============================================================================
=
=                   BASE STATION SITE CHECK
=
=                   Network:   PLMN
=                   BSC:       BSC1
=                   BCF:       SANDPD010 (10)
=                   Address:   SALONKATU
=                   Period:    from 19990914 to 19990914
=
===============================================================================
```

```
This report gives basic information about all cells of a BS site.

Measurement used: p_nbsc_traffic, p_nbsc_ho, p_nbsc_service, p_nbsc_res_avail.

===============================================================================


                               bts_1           bts_2           bts_3
------------------------------ --------------- --------------- ---------------
BTS name .............         SANDPD1019      SANDPD1020
BTS id ...............            (19)            (20)
FACCH call setups...../c1043        0               0
Normal Calls........../trf_55       4              22
Call Time............./trf_32      53 min         123 min

Handovers:
. TCH-TCH Out Succ..../ho_46       35             109
. TCH-TCH In Succ...../ho_47       35             128
. TCH-TCH Cell Succ.../c4073        0               2
. DR Out Succ........./dr_3         0               0
. DR In Succ........../dr_4         0               0
. DR Intra Succ ....../c4074        0               0

Call Success:
. SDCCH Access......../csf_1a   100.0 %         100.0 %
. SDCCH Success......./csf_2e   100.0 %         100.0 %
. TCH Access........../csf_3l   100.0 %         100.0 %
. TCH Success........./csf_4x   100.0 %          99.3 %

UL Interference......./itf_1      0.0 %           0.0 %

-

BCF Alarms
**********



BTS and TRX Alarms
******************

-

TRX quality and traffic
***********************


                                      UL     DL     Call      Avg
                                      q0-5   q0-5   time      Interf
                     TRX         TRX (%)    (%)    (min)     band
BTS name (BTS id)    id         freq ulq_2  dlq_2  trf_32a   itf_4
-------------------- ---------- ----- ------ ------ --------- ------
SANDPD1019 (19)      1           592   99.7   96.1        24 -1
                     2           601   98.6   98.4        28 -1
SANDPD1020 (20)      3           605   94.9   90.0       138 -1
                     4           595   90.4  100.0         1 -1
-





Configuration data
******************
```

```
BCF state:
. Administrative state...... Unlocked
. Alarm state............... No active alm

BCF software running:
. Package name ............. BTS_DF4_0_2
. Status ................... BACK-UP


BTS             State      Alarms           BCC Barring
--------------- ---------- ---------------- ---- ---------------
SANDPD1019      Unlocked   No active alm      1 Not barred
SANDPD1020      Unlocked   No active alm      1 Not barred



                                                 CHN   CHN        CHN
BTS (TRX)       State      Alarms            FRQ id    state      type
--------------- ---------- ---------------- ----- ----- ---------- --------
SANDPD1019 (1)  Unlocked   No active alm     592 0     Unlocked   MBCCHC
                                                 1     Unlocked   SDCCB
                                                 2     Unlocked   2
                                                 3     Unlocked   2
                                                 4     Unlocked   2
                                                 5     Unlocked   2
                                                 6     Unlocked   2
                                                 7     Unlocked   2
SANDPD1019 (2)  Unlocked   No active alm     601 0     Unlocked   2
                                                 1     Unlocked   2
                                                 2     Unlocked   2
                                                 3     Unlocked   2
                                                 4     Unlocked   2
                                                 5     Unlocked   2
                                                 6     Unlocked   2
                                                 7     Unlocked   2



                                                 CHN   CHN        CHN
BTS (TRX)       State      Alarms            FRQ id    state      type
--------------- ---------- ---------------- ----- ----- ---------- --------
SANDPD1020 (3)  Unlocked   No active alm     605 0     Unlocked   2
                                                 1     Unlocked   2
                                                 2     Unlocked   2
                                                 3     Unlocked   2
                                                 4     Unlocked   2
                                                 5     Unlocked   2
                                                 6     Unlocked   2
                                                 7     Unlocked   2
SANDPD1020 (4)  Unlocked   No active alm     595 0     Unlocked   MBCCHC
                                                 1     Unlocked   SDCCB
                                                 2     Unlocked   2
                                                 3     Unlocked   2
                                                 4     Unlocked   2
                                                 5     Unlocked   2
                                                 6     Unlocked   2
                                                 7     Unlocked   2
```

Figure 208. Report 221: Base station site check.

Appendix A.

Modified reports

Table 10. Modified reports

Report	Changes
020	Bugs in MR selection fixed.
041	Bugs in MR selection fixed.
051	Segment name&id and Master BTS indicator columns added.
063	Support for band GSM850 added.
068	Support for band GSM850 added.
074	Column widened.
081	Parameter set name column widened.
082	MR Ident. changed from integer to string.
095	MR Ident. changed from integer to string.
099	Bug fix: If there were several BCFs with the same name, they were shown as one BCF, now separately.
121	S10.5 measurements added: p_nbsc_utran_ncell_sig_level p_nbsc_utran_ho_adj_cell p_nbsc_qos p_nbsc_pbcch_avail p_nbsc_dynamic_abis and p_nbsc_coding_scheme
125	Column formatting corrected.
127	S10.5 measurements added: p_nbsc_utran_ncell_sig_level p_nbsc_utran_ho_adj_cell p_nbsc_qos p_nbsc_pbcch_avail p_nbsc_dynamic_abis and p_nbsc_coding_scheme
133	Bugs in MR selection fixed.
136	Bug in MR selection fixed.
153	Support for band GSM850 added.
155	Segment name and id columns added to BTS level report.
156	Segment name and id columns added.

Table 10. Modified reports (Continued)

Report	Changes
157	trf_13d changed to trf_13e ’HOs’ changed to ’Inter-cell HOs’.
162	Bug fix: Decodes added to prevent division by zero.
190	MHA description updated.
191	Bug fix: decodes added to prevent divisions by zero.
195	Bug fix: Some decodes added to prevent division by zero.
198	Bug fix: decode added to prevent division by zero.
200	csf_2j changed to csf_2m. trf_13d changed to trf_13e.
204	MHA description updated. PCCCH paging counters added (c91017, c91018, c91019, c91020). csf_2j changed to csf_2m. trf_13e added.
205	Previous hour option added to BH Selection. Segment aggregation level added. Segment name and id added to BTS level report. csf_2n added.trf_13d changed to trf_13e.
207	csf_2j changed to csf_2m.
212	Added counters PACKET_IMMED_ASS_UL_MSG PACKET_IMMED_ASS_DL_DRX_MSG PACKET_IMMED_ASS_DL_NON_DR
213	PBCCH availability measurement added. TBF duration accuracy increased to 2 decimals Radio link parameters, HYS, TXP, RXP and RLT added. QoS module added, which contains Segment configuration and QoS measurement. Support for frequency band GSM850 added.
215	Column formatting corrected.
216	Radio link parameters, HYS, TXP, RXP and RLT added. trf_13d changed to trf_13e. csf_2k changed to csf_2n.

Table 10. Modified reports (Continued)

Report	Changes
229	Bug fix in Busy hour selection. tbf_5a and tbf_6a changed to give 2-decimal accuracy. trf_123 and trf_124 field length increased. Segment aggregation level added. Segment name & id added to BTS level report. Bug fix: Division by zero problem corrected. tbf_37b and tbf_38b added.
231	Column formatting corrected.
234	Bug fix: protect for situation ’no data’.
235	Added counters PACKET_IMMED_ASS_UL_MSG, PACKET_IMMED_ASS_DL_DRX_MSG and PACKET_IMMED_ASS_DL_NON_DR. Report renamed from ’PCU measurement counters’ to ’GPRS counters’. In addition to PCU GPRS counters, this report now also contains GPRS counters from Traffic, Resource access and Resource availability measurements.
242	Segment name and id columns added to BTS level report.
243	Bug fix: Data type comparison problem corrected.
245	Codec column formatting added.
250	csf_2k changed to csf_2n.
251	csf_2k changed to csf_2n.
401	Bug fix: Decode added to prevent division by zero.
502	Parts C_FHS and C_BCF_OUTPUTS removed, because those tables were removed in OSS3.1.
518	BSC ET index field extended from 2 to 4 digits
522	BSC ET index field extended from 2 to 4 digits
800	csf_2j changed to csf_2m.
801	csf_2j changed to csf_2m.

Changes in KPIs used in reports

Table 11. Changes in KPIs used in reports

Report	Changes
157 200 204 205 216	trf_13d changed to trf_13e ’HOs’ changed to to’Inter-cell HOs’
200 204 207 800 801	csf_2j changed to csf_2m.
205 216 250 251	csf_2n added. csf_2k changed to csf_2n. csf_2k changed to csf_2n. csf_2k changed to csf_2n.
229	tbf_37b and tbf_38b added.

Index

Numerics

10 -day/24 -hour profiles **30**
12 -hour reporting interval **56**
15 -min or 30 -minute reporting interval **52**
60 -minute reporting interval **27, 52, 56**

A

Abis failures **102**
actions to take before using **51**
active measurements in the BSC **53**
adjacencies **43**
adjacent frequencies **75**
administration **44**
alarm filtering and acknowle dging **64**
alarm types and counts **207**
alarms
  2567, BCCH Missing. **149**
  7705, LAPD Link Failure. **149**
  active BCCH missing (2567, 7767). **212**
  number per object **209**
alarms **207**
analysis **49**
area level
  availability of SDCCH and TCH **170**
  call success **145**
  handover cause **287**
  handover failure ratio **114**
  intelligent underlay -overlay **181**
  link balance **275**
  report 200, Performance statistics (benchmark). **304**
  report 204, Network benchmark statistics. **304**
  SDCCH congestion and blocking **126**
  TCH congestion **129**
  TCH drop call ratio **105**
  uplink and downlink quality **269**
  uplink interference **173**
area level counts **80**
area selection **37**
availability **45**

B

basic measurements **56**
BCCH allocation list **61**
benchmark and analysis **49, 303**
BSC clear codes **290**
BSC level
  alarm types and counts **208**
  availability of transceivers **169**
  BSC clear codes **290**
  hourly traffic **133**
  location update success **124**
  TCH drop call ratio **107**
BSS measurements **56**
BSS Network Doctor **40, 56**
BSS transmission availability and quality **47**
BTS GSM KPI/PI table, dynamic object and time aggregation. **305**
BTS hit lists
  availability of time slots **170**
  distance ranges **286**
  handover cause **288**
  handover failure ratio **118**
  link balance **276**
  SDCCH congestion and blocking **126**
  TCH congestion and blocking **130**
  TCH drop call ratio **108**
  traffic **136**
  troubleshooting **294**
  uplink interference **174**
BTS level
  link balance **279**
  traffic **137**
busy hour **49, 110, 136, 137, 182, 289**

C

call blocking **132**
call success **47, 145**
cell
  coverage **285**
  dimensioning **125**
  identity **79, 217**
cell coverage **44**
checking
  adjacency plan **90**
  administrative states **98**
  availability of time slots **170**
  blocked or filtered alarms **64**
  BTS object instance **51**
  cell for possible interference **178**
  discrepancies with MML **74**
  frequency plan **97**
  maintenance region assignments **64**
  measurement flow **62**
  measurements sending data to the database **53**
  PLMN object **51**

checks **42**
CIs **215**
configuration management **41**
congestion **125**
consistency checks **71**
counter formulas **33**
counters **33**

D

daily values **106**, **134**, **146**
database tables **57**
distance ranges **286**
dominant path balance range **280**
double BA list **178**
drop call **45**
drop call ratio **30**, **45**
dtpad **35**
dual band **298**
DX 200 network elements **64**

E

Erlang **134**

F

fault management **41**
finding
  adjacencies **74**
  cell **41**
  errors in assignments **68**
  existing dimensioning problems in the network **125**
  future dimensioning problems **125**
formulas **33**
frequencies **44**
frequency plan **44**, **97**, **203**

G

ghost RACH accesses **102**
GPRS **48**, **225**

H

half/full rate **223**
handover
  causes **287**
  failure ratio **45**, **114**
  synchronisation between adjacent cells **77**
handover **45**, **56**
hourly handover cause counts **290**

I

identification number **41**
intelligent underlay -overlay **47**
interference
  from the same or adjacent frequencies **178**
interference **75**, **78**, **173**
interference, quality and link balance. **46**
invalid number **51**
IUO **47**

K

key performance indicators **25**, **31**, **49**, **190**, **303**

L

LACs **215**
link balance **275**
link quality **46**
locating network elements **215**
location area codes **79**, **199**, **217**

M

maintenance regions
  using for reporting **64**
measurement flow from a BSC **62**
measurement types
  Link Balance **275**
  MS Speed **280**
  Power Control **276**
  Rx Level Statistics **271**, **304**
  Timing Advance **285**
  Undefined Adjacent Cell **61**
MML **61**, **63**, **64**
model reports **29**, **35**
monitoring
  intelligent underlay -overlay **181**
  quality of a cellular network **29**
  user log data **38**

N

named parameter set audit **43**
named sets **219**
network configuration **193**
network entities **43**
network level

BSC clear codes 291
report 034, Alarm types and counts. 207
network level 41
Nokia NetAct
load on 27
optimal configuration 28
statistics 32
Nokia NetAct database 33, 43, 51, 63, 64, 69, 71, 80, 88, 177, 199, 208

O

object resolution 57

P

performance indicators 30, 49, 303
prerequisites
for effective analysis of the network 27

Q

quality of the radio network plan 101
quality survey 266

R

radio network plan 33, 71
report
automatic running of 27
format 36
front page description 27
identification number 35
menus 40
models 35
output 36
scopes 28
reporting intervals 26, 52
reporting procedures 29
Rx quality 269, 304

S

SDCCH
congestion and blocking 125
drop ratio 102
drop ratio on BTS hit list 103
SDCCH and TCH access 45
SDCCH drop ratio 102
setting
history windows 69
measurements 56
SQL*Plus 52
storing periods 69

T

TCH
congestion and blocking 129
drop call ratio 30, 105
time slots 170, 173
Top -level User Interface 43, 71, 88
traffic absorption 47, 190
traffic and load 46
transceivers 169
transcoder failures 107
transmission 149
transmission object profiles 154
troubleshooting 294
TRX level GSM KPI/PI table, dynamic time aggregation . 308

U

UL and DL quality 270, 274
UL and DL quality distribution 273
UL interference 32, 173
using
BSS Network Doctor 31

W

working sets 28