

**Switching System Generic Requirements
Supporting ISDN Access
Using the ISDN User Part**

Contents

| | |
|---|------|
| 1. INTRODUCTION | 1-1 |
| 1.1 REQUIREMENTS TERMINOLOGY | 1-1 |
| 1.2 DEFINITION | 1-1 |
| 1.3 BACKGROUND | 1-2 |
| 1.4 HIGH LEVEL DESCRIPTION | 1-3 |
| 2. USER PERSPECTIVE | 2-1 |
| 3. FEATURE REQUIREMENTS | 3-1 |
| 3.1 FEATURE OPERATIONS | 3-1 |
| 3.1.1 Main Feature Operations | 3-1 |
| 3.1.1.1 ISDN Call Establishment; Originating Exchange | 3-2 |
| 3.1.1.2 Call Establishment; Intermediate Exchange | 3-23 |
| 3.1.1.3 Call Establishment; Terminating Exchange | 3-25 |
| 3.1.1.4 Continuity Check Procedures | 3-45 |
| 3.1.1.5 Completion of Transmission Path | 3-45 |
| 3.1.1.6 The Address Complete Message (ACM) | 3-48 |
| 3.1.1.7 The SS7 Call Progress Message (CPG) | 3-59 |
| 3.1.1.8 The Answer Message (ANM) | 3-66 |
| 3.1.1.9 Called Party Busy (Network Determined) | 3-68 |
| 3.1.2 Other Feature Operations | 3-69 |
| 3.1.2.1 Unrecognized Messages; The Confusion Message (CFN) | 3-69 |
| 3.1.3 Release Treatment | 3-70 |
| 3.1.3.1 General Release Procedures | 3-70 |
| 3.1.3.2 Release at Originating ISDN Interface | 3-70 |
| 3.1.3.3 Release at an Intermediate Exchange | 3-76 |
| 3.1.3.4 Release at Terminating ISDN Interface | 3-77 |
| 3.1.4 Error Treatment and Abnormal Events | 3-94 |

| | |
|--|-------|
| 3.1.4.1 Unsuccessful Call Completion At Tandem and Terminating Exchanges | 3-94 |
| 3.2 INTERNAL CALL PROCESSING CONTROLS | 3-99 |
| 3.2.1 Screening | 3-99 |
| 3.3 ADMINISTRATION | 3-100 |
| 3.3.1 Data Items and Usage | 3-100 |
| 3.4 MAINTENANCE | 3-100 |
| 3.5 INTERACTIONS | 3-100 |
| 3.5.1 ISDN SS7 Incoming Circuit, Inband Signaling On Outgoing Circuit | 3-100 |
| 3.5.1.1 Call Establishment | 3-100 |
| 3.5.1.2 Connection Release | 3-101 |
| 3.5.2 Inband Signaling On Incoming Circuit, ISDN SS7 Outgoing Circuit | 3-101 |
| 3.5.2.1 Call Establishment | 3-101 |
| 3.5.2.2 Connection Release | 3-101 |
| 3.6 TIMING AND TOLERANCES | 3-102 |
| 4. GLOSSARY | 4-1 |
| REFERENCES | R-1 |
| APPENDIX A: SS7 MESSAGES | A-1 |
| APPENDIX B: SS7 PARAMETERS | B-1 |
| Appendix C: Message Flow Diagram | C-1 |
| Appendix D: Mappings Between Q.931 Information Elements and SS7 Parameters | D-1 |

List of Tables

| | |
|---|------|
| Table 3-1. Bit Transmission Order | 3-3 |
| Table 3-2. Coding Rules for the Called Party Number Parameter | 3-5 |
| Table 3-3. Type of Number and Numbering Plan; Q.931 -> SS7 CPN | 3-9 |
| Table 3-4. Origin of Number and Presentation Status; Access -> SS7 CPN | 3-9 |
| Table 3-5. Type of Number and Numbering Plan; Q.931 -> SS7 GAP | 3-11 |
| Table 3-6. Origin of Number and Presentation Status; Access -> SS7 GAP | 3-12 |
| Table 3-7. Type of Number and Numbering Plan; Q.931 (First or Only) RNIE -> SS7 OCN at Originating SPCS | 3-19 |
| Table 3-8. Origin of Number and Presentation Status; Q.931 (First or Only) RNIE -> SS7 OCN at Originating SPCS | 3-20 |
| Table 3-9. Type of Number and Numbering Plan; Q.931 (Second) RNIE -> SS7 RN at Originating SPCS | 3-21 |
| Table 3-10. Origin of Number and Presentation Status; Q.931 (Second) RNIE -> SS7 RN at Originating SPCS | 3-22 |
| Table 3-11. Responses to Sending IAM | 3-23 |
| Table 3-12. Nature of Address and Numbering Plan; SS7 CPN -> Q.931 | 3-29 |
| Table 3-13. Presentation and Screening Coding; SS7 CPN -> Q.931 | 3-30 |
| Table 3-14. Nature of Address and Numbering Plan; SS7 GAP -> Q.931 | 3-31 |
| Table 3-15. Origin of Number and Presentation Status; SS7 GAP -> Q.931 | 3-32 |
| Table 3-16. Type of Number and Numbering Plan; SS7 OCN -> Q.931 (First or Only) RNIE at Terminating SPCS | 3-34 |

| | |
|--|------|
| Table 3-17. Origin of Number and Presentation Status; SS7 OCN -> Q.931 (First or Only) RNIE at Terminating SPCS | 3-35 |
| Table 3-18. Type of Number and Numbering Plan; SS7 RN -> Q.931 (Second) RNIE at Terminating SPCS | 3-36 |
| Table 3-19. Origin of Number and Presentation Status; SS7 RN -> Q.931 (Second) RNIE at Terminating SPCS | 3-37 |
| Table 3-20. Events Following Sending First SETUP to Called Party | 3-44 |
| Table 3-21. Completion of Transmission Path at Originating and Intermediate SPCS | 3-46 |
| Table 3-22. Responses to Sending ACM | 3-52 |
| Table 3-23. Mapping of SS7 Cause Value to Inband Treatment | 3-72 |
| Table 3-24. Mapping of SS7 Cause Value to Signal Information Element | 3-73 |
| Table 3-25. Coding of Backward Call Indicators Parameter | 3-79 |
| Table 3-26. Events Resulting in Unsuccessful Call | 3-95 |
| Table 3-27. Coding of Backward Call Indicators Parameter | 3-96 |
| Table A-1. Address Complete Message | A-2 |
| Table A-2. Answer Message | A-2 |
| Table A-3. Call Progress Message | A-3 |
| Table A-4. Confusion Message | A-3 |
| Table A-5. Initial Address Message | A-4 |
| Table A-6. Release Message | A-5 |
| Table A-7. Suspend Message and Resume Message | A-5 |

List of Figures

| | |
|--|------|
| Figure B-1. Access Transport Parameter | B-3 |
| Figure B-2. Backward Call Indicators | B-4 |
| Figure B-3. Called Party Number Parameter | B-6 |
| Figure B-4. Calling Party Number Parameter | B-8 |
| Figure B-5. Cause Indicators Parameter | B-11 |
| Figure B-6. Event Information Parameter | B-15 |
| Figure B-7. Forward Call Indicators Parameter | B-16 |
| Figure B-8. Generic Address Parameter | B-18 |
| Figure B-9. Message Type Parameter | B-20 |
| Figure B-10. Optional Backward Call Indicators Parameter | B-21 |
| Figure B-11. User Service Information Parameter | B-23 |
| Figure B-12. Original Called Number Parameter | B-24 |
| Figure B-13. Redirection Information Parameter | B-27 |

List of Figures

| | |
|--|------|
| Figure C-1. Simple case | C-1 |
| Figure C-2. Speech or 3.1 kHz call to Class II equipment subscribed to remote network interworking | C-2 |
| Figure C-3. Simple Call to Non-ISDN Called Interface | C-3 |
| Figure C-4. Simple Call to Non-ISDN Called Interface, Called Party Disconnect | C-4 |
| Figure C-5. Second Setup and Call Proceeding at Terminating ISDN Interface, ISDN Calling Interface | C-6 |
| Figure C-6. Second Setup and Call Proceeding at Terminating ISDN Interface, Non-ISDN Calling Interface | C-6 |
| Figure C-7. Release Complete After Second Setup at ISDN Interface, Speech or 3.1 kHz Audio Call | C-7 |
| Figure C-8. Release Complete After Second Setup at Terminating ISDN Interface, Unrestricted Digital Information Call | C-8 |
| Figure C-9. SS7 to MF Interworking | C-9 |
| Figure C-10. Release Complete with Call Rejected after First Setup, Non-ISDN Calling Party | C-10 |