RTCA, Inc.
1140 Connecticut Avenue, NW, Suite 1020
Washington, DC 20036-4001 USA

Minimum Operational Performance Standards (MOPS) For Geosynchronous Orbit Aeronautical Mobile Satellite Services (AMSS) Avionics

RTCA DO-210D
April 19, 2000

Prepared by: SC-165
© 2000 RTCA, Inc.

Copies of this document may be obtained from

RTCA, Inc.

Telephone: 202-833-9339
Facsimile: 202-833-9434
Internet: www.rtca.org

Please visit the RTCA Online Store for document pricing and ordering information.

F O R E W O R D

This document was prepared by RTCA Special Committee 165 (SC-165). It was approved by the RTCA Program Management Committee on April 19, 2000.

RTCA, Inc., is an association of aeronautical organizations of the United States from both government and industry. Dedicated to the advancement of aeronautics, RTCA seeks sound technical solutions to problems involving the application of electronics and telecommunications to aeronautical operations. Its objective is the resolution of such problems by mutual agreement of its member organizations. The findings of RTCA are in the nature of recommendations to all organizations concerned. As RTCA is not an official agency of the United States government, its recommendations may not be regarded as statements of official government policy unless so enunciated by the U.S. government organization or agency having statutory jurisdiction over any matters to which the recommendations relate.

PROPRIETARY DISCLAIMER

This publication makes references to written material or systems that are protected by copyrights and/or patents. RTCA offers no opinion on the validity of the proprietary claims of the specified holder(s) of copyrights and/or patents; neither does RTCA endorse or warrant the product of specific manufacturers or holders of copyrights and/or patents. RTCA has no economic stake in the use of any proprietary product.

TABLE OF CONTENTS

Page

1.0 PURPOSE AND SCOPE 1

1.1 Introduction 1

1.2 System Overview 3
1.2.1 AMSS Architecture 3
1.2.2 Communications Characteristics 4
1.2.3 Operational Service Levels 5
1.2.4 Ground Equipment Requirements 6
1.2.5 Satellite Requirements 6
1.2.6 Service Providers 6
1.2.7 Communication Protocols 7

1.3 Operational Applications 7
1.3.1 Air Traffic Services (ATS) 8
1.3.1.1 Air Traffic Control (ATC) 8
1.3.1.2 Flight Information Services (FIS) 9
1.3.1.3 Alerting Service 10
1.3.1.4 Automatic Dependent Surveillance (ADS) 10
1.3.2 Aeronautical Operational Control (AOC) 10
1.3.2.1 AOC Functions 10
1.3.2.2 Operations Services 11
1.3.3 Non-Safety Services 11
1.3.3.1 Aeronautical Administrative Communications (AAC) 11
1.3.3.2 Aeronautical Passenger Communications (APC) 11

1.4 Operational Goals 11
1.4.1 Global Coverage 12
1.4.2 Compatibility and Interoperability 12
1.4.3 End-to-End Service Criteria 12

1.5 Assumptions and Postulated Environment 13
1.5.1 Coverage 13
1.5.2 Data and Voice Communications 13
1.5.3 Safety 14
1.5.4 Priority, Precedence and Preemption 14
1.5.5 Vocoder Qualifications 14

1.6 Overview of Test and Performance Verification Procedures 15
1.6.1 Environmental Tests and Performance Verification 15
1.6.2 Bench Tests and Performance Verification 15
1.6.3 Installed Equipment Tests and Performance Verification 15
1.6.4 Operational Tests and Performance Verification 16

2.0 EQUIPMENT PERFORMANCE REQUIREMENTS AND TEST PROCEDURES 17

Page

2.1 General Requirements 17
2.1.1 Airworthiness 17
2.1.2 Intended Function 17
2.1.3 Federal Communications Commission Rules 17
2.1.4 Fire Protection 17
2.1.5 Operation of Controls 17
2.1.6 Accessibility of Controls 17
2.1.7 Effects of Tests 18
2.1.8 Performance in a Shared Environment 18

2.2 Equipment Performance Requirements -- Standard Conditions 18
2.2.1 Priority, Precedence and Preemption 18
2.2.2 AES Subsystem Definitions and Overall Requirements 19
2.2.2.1 AES Effective Isotropic Radiated Power (EIRP) and Figure-of-Merit 19
2.2.3 Antenna Subsystem Requirements 20
2.2.3.1 General 20
2.2.3.1.1 Frequency Range 20
2.2.3.1.2 Polarization 20
2.2.3.2 Antenna Gain and Coverage Volume 21
2.2.3.2.1 High Gain Antenna 21
2.2.3.2.2 Low Gain Antenna 21
2.2.3.2.3 Intermediate Gain Antenna 22
2.2.3.3 Axial Ratio 23
2.2.3.3.1 High Gain and Intermediate Gain Antenna 23
2.2.3.3.2 Low Gain Antenna 23
2.2.3.4 Pattern Discrimination 23
2.2.3.4.1 High Gain Antenna 23
2.2.3.4.2 Intermediate Gain Antenna 23
2.2.3.5 Voltage Standing Wave Ratio (VSWR) 24
2.2.3.6 Phase Discontinuity 24
2.2.3.6.1 High Gain Antenna 24
2.2.3.6.2 Intermediate Gain Antenna 24
2.2.3.7 Antenna Switching Time 25
2.2.3.8 Beam Switching Time 25
2.2.3.9 Pointing Response Time 25
2.2.3.10 Power Handling 25
2.2.3.11 Carrier to Multipath Discrimination -- High Gain Antenna and Intermediate Gain Antenna 25
2.2.3.12 Antenna Intermodulation in the Receive Band 25
2.2.3.13 Radiated Antenna Intermodulation Products 26
2.2.4 Satellite Subnetwork Physical Layer Requirements 26
2.2.4.1 Receiver Requirements 26
2.2.4.1.1 Channel Rates 26
2.2.4.1.2 Receiver Sensitivity 27
2.2.4.1.3 Rejection of Signals in the AES Receive Band 28
2.2.4.1.4 Rejection of Signals Outside the AES Receive Band 28
2.2.4.1.5 Receiver Linearity 28
2.2.4.1.6 Desired Signal Dynamic Range 28
2.2.4.1.7 Receiver Tuning 29

Page

2.2.4.1.8 Capture Range 29
2.2.4.1.9 Doppler Rate 29
2.2.4.1.10 Phase Discontinuity 29
2.2.4.1.11 P-Channel Configuration and Receiver Requirements 29
2.2.4.1.12 C-Channel Configuration and Receiver Requirements 31
2.2.4.2 Transmitter Requirements 33
2.2.4.2.1 Channel Rates and Tolerances 33
2.2.4.2.2 Output Power 34
2.2.4.2.3 Output Power Adjustment 34
2.2.4.2.4 Output Power Stability 35
2.2.4.2.5 Harmonics, Discrete Spurious and Noise Density 35
2.2.4.2.6 Intermodulation Products 36
2.2.4.2.7 Carrier Off Level 37
2.2.4.2.8 Transmitter/Channel Muting 37
2.2.4.2.9 Load VSWR Capability 38
2.2.4.2.10 Transmitter Tuning 38
2.2.4.2.11 Tuning Stabilization Time 39
2.2.4.2.12 Phase Noise 39
2.2.4.2.13 Frequency Accuracy 40
2.2.4.2.14 Doppler Correction 40
2.2.4.2.15 Doppler Rate Capability 40
2.2.4.2.16 Signal Spectrum 40
2.2.4.2.17 R- and T-Channel Configuration and Transmitter Requirements 42
2.2.4.2.18 C-Channel Transmitter Requirements 42
2.2.5 Satellite Subnetwork Data Link Layer Functions 43
2.2.6 Satellite Subnetwork Management Requirements 44
2.2.7 Packet-Mode Data Service Requirements 46
2.2.7.1 Packet-Mode Data-2 Service Requirements 46
2.2.7.2 Packet-Mode Data-3 Service Requirements 46
2.2.7.3 Priority, Precedence and Preemption 48
2.2.7.4 Satellite Subnetwork Requirements 50
2.2.7.4.1 Data-2 AES Requirements 50
2.2.7.4.2 Data-3 AES Requirements 52
2.2.7.5 Avionics Subnetwork Interface Requirements 56
2.2.7.5.1 Physical and Data Link Layer Requirements 60
2.2.7.5.2 Data-3 Subnetwork Access Protocol Requirements 60
2.2.7.6 Join and Leave Event Requirements 73
2.2.8 Circuit-Mode Service Requirements (Optional) 74
2.2.8.1 Priority, Precedence and Preemption 77
2.2.8.2 Cockpit Services Interworking Requirements 78
2.2.8.2.1 Call Establishment -- Air to Ground 78
2.2.8.2.2 Call Establishment -- Ground to Air 79
2.2.8.2.3 Call Termination 81
2.2.9 Recovery from Primary Power Interruption 82
2.2.10 Failure/Status Indication 83

2.3 Equipment Performance -- Environmental Conditions 83
2.3.1 General Requirements 83
2.3.2 Equipment Configurations 84

Page

2.3.3 Configuration Control 84
2.3.4 Specific Environmental Test Conditions 84

2.4 Equipment Performance Verification Procedures 90
2.4.1 Special Cooling Requirements 90
2.4.2 Warm-up and Stabilization Requirements 90
2.4.3 Antenna Subsystem Test Requirements 90
2.4.3.1 Test Conditions 91
2.4.3.1.1 Antenna Under Test 91
2.4.3.1.2 Test Frequencies 91
2.4.3.2 Required Test Equipment 91
2.4.3.2.1 Standard Test Equipment 91
2.4.3.2.2 Special Test Equipment 92
2.4.3.3 Detailed Performance Verification Procedures 93
2.4.3.3.1 Antenna Gain and Coverage Volume (Section 2.2.3.2) 93
2.4.3.3.2 Axial Ratio (Section 2.2.3.3) 100
2.4.3.3.3 Pattern Discrimination - High Gain Antenna (Section 2.2.3.4.1) or Intermediate Gain Antenna (Sections 2.2.3.4.2.1 and 2.2.3.4.2.2) 103
2.4.3.3.4 Voltage Standing Wave Ratio (Section 2.2.3.5) 103
2.4.3.3.5 Phase Discontinuity - High Gain Antenna (Section 2.2.3.6.1) or Intermediate Gain Antenna (Section 2.2.3.6.2) 104
2.4.3.3.6 Antenna Switching Time (Multiple Antennas) (Section 2.2.3.7) 104
2.4.3.3.7 Beam Switching Time (Section 2.2.3.8) 105
2.4.3.3.8 Pointing Response Time - (Section 2.2.3.9) 106
2.4.3.3.9 Power Handling (Section 2.2.3.10) 107
2.4.3.3.10 Carrier/Multipath Discrimination - HGA and IGA (Section 2.2.3.11) 108
2.4.3.3.11 Antenna Intermodulation in the Receive Band (Section 2.2.3.12) 112
2.4.3.3.12 Radiated Antenna Intermodulation Products (Section 2.2.3.13) 113
2.4.4 Transceiver Subsystem (Satellite Subnetwork Physical Layer) Performance Verification Requirements 116
2.4.4.1 Definitions of Terms and Conditions of Test 116
2.4.4.2 Detailed Test Procedures - Receiver 118
2.4.4.2.1 Pre-Viterbi P-channel BER Characterization 118
2.4.4.2.2 Sensitivity (Section 2.2.4.1.2) 120
2.4.4.2.3 Rejection of Signals Within and Outside the Transceiver Receive Band (Sections 2.2.4.1.3 and 2.2.4.1.4) 121
2.4.4.2.4 Receiver Linearity (Section 2.2.4.1.5) 123
2.4.4.2.5 Desired Signal Dynamic Range (Section 2.2.4.1.6) 125
2.4.4.2.6 Receiver Tuning (Section 2.2.4.1.7) 127
2.4.4.2.7 Capture Range and Doppler Rate (Section 2.2.4.1.8 and 2.2.4.1.9) 127
2.4.4.2.8 Bit Error Rate Performance and Phase Discontinuity (Sections 2.2.4.1.10 and 2.2.4.1.11.1) 130
2.4.4.2.9 Time to Acquire Superframe Lock (Section 2.2.4.1.11.2) 131
2.4.4.2.10 Circuit-Mode Voice Requirements (Section 2.2.4.1.12.1.1) 132
2.4.4.2.11 C-channel Bit-Timing Recovery (Frequency Uncertainty) (Section 2.2.4.1.12.2) 132
2.4.4.2.12 Frame Lock Acquisition and False Frame Lock Probabilities (Section 2.2.4.1.12.3) 134
2.4.4.2.13 Maintaining Bit Synchronization (Section 2.2.4.1.12.4) 135
2.4.4.2.14 C-channel BER Measurement and Accuracy (Section 2.2.4.1.12.5) 135

Page

2.4.4.3 Detailed Test Procedures - Transmitter 136
2.4.4.3.1 Channel Rates and Tolerance (Section 2.2.4.2.1) 136
2.4.4.3.2 Output Power (Section 2.2.4.2.2) 137
2.4.4.3.3 Output Power Adjustment (Section 2.2.4.2.3) 138
2.4.4.3.4 Output Power Stability (Section 2.2.4.2.4) 139
2.4.4.3.5 Harmonics, Spurious, and Noise (Section 2.2.4.2.5) 140
2.4.4.3.6 Intermodulation Products (Section 2.2.4.2.6) 141
2.4.4.3.7 Carrier Off Level (Section 2.2.4.2.7) 143
2.4.4.3.8 Transmitter Muting (Section 2.2.4.2.8) 144
2.4.4.3.9 Load VSWR Capability (Section 2.2.4.2.9) 145
2.4.4.3.10 Tuning Range and Channel Increments and Channel Numbering (Sections 2.2.4.2.10.1 and 2.2.4.2.10.2) 148
2.4.4.3.11 Tuning Stabilization Time (Section 2.2.4.2.11) 149
2.4.4.3.12 Phase Noise (Section 2.2.4.2.12) 150
2.4.4.3.13 Frequency Accuracy (Section 2.2.4.2.13) 151
2.4.4.3.14 Doppler Correction (Section 2.2.4.2.14) 152
2.4.4.3.15 Doppler Rate Capability (Section 2.2.4.2.15) 153
2.4.4.3.16 Signal Spectrum (Section 2.2.4.2.16) 154
2.4.4.3.17 Transmit Pulse-Shaping Filter Response (Sections 2.2.4.2.17.1 and 2.2.4.2.18.1) 155
2.4.5 Satellite Subnetwork Data Link Layer Test Requirements (Sections 2.2.5 and 2.2.7) 156
2.4.6 Satellite Subnetwork Management Test Requirements (Section 2.2.6) 162
2.4.6.1 Manually Initiated GES-to-GES Handover (Section 2.2.6) 167
2.4.6.2 User Commanded Satellite-to-Satellite Handover (Section 2.2.6) 167
2.4.6.3 Selective Release (Section 2.2.6) 168
2.4.7 Satellite Subnetwork Packet-Mode Data Service Test Requirements (Section 2.2.7) 168
2.4.7.1 Packet-Mode Data-2 Service Test Requirements (Section 2.2.7) 172
2.4.7.2 Packet-Mode Data-3 Service SSND Sublayer Test Requirements (Section 2.2.7) 172
2.4.7.3 Packet-Mode Data-3 Service ISO 8208 Test Requirements (Section 2.2.7) 174
2.4.7.3.1 Channel State Test Procedures 176
2.4.7.3.2 Multiple Channel Packet Assembly and Disassembly 189
2.4.7.3.3 Call Setup and Maintenance 191
2.4.7.3.4 Multiple Channel Transactions 196
2.4.7.3.5 ISO 8208 DCE Timer Test Procedures (Section 2.2.7.5.2.3.4) 198
2.4.7.4 Join and Leave Event Test Requirements (Section 2.2.7.5.3) 200
2.4.8 Satellite Subnetwork Circuit-Mode Service Test Requirements (Optional) (Section 2.2.8) 200
2.4.8.1 Priority, Precedence and Preemption (Sections 2.2.1 (circuit mode) and 2.2.8.1) 207
2.4.9 Failure/Status Indication (Section 2.2.10) 208

3.0 INSTALLED EQUIPMENT PERFORMANCE 209

3.1 Equipment Installation 209
3.1.1 Accessibility 209
3.1.2 Aircraft Environment 209
3.1.3 Display Visibility 209
3.1.4 Inadvertent Turn Off 209
3.1.5 Failure Protection 209
3.1.6 Interface Interference Effects 209
3.1.7 Aircraft Power Source 210

Page

3.2 Installed Equipment Performance Requirements 210

3.3 Conditions of Test 210
3.3.1 Power Input 211
3.3.2 Environment 211
3.3.3 Adjustment of Equipment 211
3.3.4 Warm-up Period 211

3.4 Test Procedures for Installed Equipment Performance 211
3.4.1 Conformity Inspection 211
3.4.2 Interference Tests 211
3.4.3 Power Fluctuation Tests (Section 2.2.9) 212
3.4.4 Ground Test Procedures 212
3.4.5 Flight Test Procedures 213
3.4.6 Installed AES System Performance Verification 214
3.4.6.1 AES EIRP 214
3.4.6.2 AES G/T 215
3.4.6.3 AES Coverage Volume (Sections 2.2.3.2 and 2.2.3.3) 216

4.0 EQUIPMENT OPERATIONAL PERFORMANCE CHARACTERISTICS 217

4.1 Operational Performance Requirements 217
4.1.1 Power Input 217
4.1.2 Communications Displays 217
4.1.3 Communications Controls 217
4.1.4 System Operational Indication 217
4.1.5 Equipment Operating Limitations 217

4.2 Test Procedures for Operational Performance Requirements 217
4.2.1 Power Input 217
4.2.2 Communications Displays 218
4.2.3 Communications Controls 218
4.2.4 System Operational Indication 218

Membership 219

Appendix A -- Glossary and Acronyms

Appendix B -- AES G/T Derivations

Appendix C -- Index Correlating Requirements and Verification Procedures

Page

TABLE OF FIGURES

Figure 1-1 AMSS End-to-End System Model 2
Figure 2-0 AES Per-Carrier Transmit Spectrum 41
Figure 2-1 Satellite Subnetwork Architecture (Airborne Side) 47
Figure 2-2 Relationship Between Packets and SNPDUs (Example of Events) (A) 58
Figure 2-3 Relationship Between Packets and SNPDUs (Example of Events) (B) 59
Figure 2-4 [Reserved] 60
Figure 2-5 DCE Substate Hierarchy 61
Figure 2-6 Cockpit Protocol Interworking -- Air-to-Ground Call Establishment 79
Figure 2-7 Cockpit Protocol Interworking -- Ground-to-Air Call Establishment 80
Figure 2-8 Cockpit Protocol Interworking -- Air-Initiated Call Clearing 81
Figure 2-9 Cockpit Protocol Interworking -- Ground-Initiated Call Clearing 82
Figure 2-10 Gain and Coverage, Axial Ratio, Pattern Discrim., Phase Discontinuity, C/M Discrim. -- Sections 2.4.3.3.1, 2.4.3.3.2, 2.4.3.3.3, 2.4.3.3.5, 2.4.3.3.10 94
Figure 2-11 Noise Temperature (Antenna Gain and Coverage) -- Section 2.4.3.3.1.3 97
Figure 2-12 Voltage Standing Wave Ratio (VSWR) -- Section 2.4.3.3.4 104
Figure 2-13 Antenna Switching Time -- Section 2.4.3.3.6 105
Figure 2-14 Beam Switching Time -- Section 2.4.3.3.7 106
Figure 2-15 Pointing Response Time -- Section 2.4.3.3.8 107
Figure 2-16 Power Handling -- Section 2.4.3.3.9 108
Figure 2-17 Antenna Intermodulation in the Receive Band -- Section 2.4.3.3.11 113
Figure 2-17a Radiated Antenna Intermodulation Products -- Section 2.4.3.3.12 115
Figure 2-18 Pre-Viterbi P-Ch Char., BER Perf., Cct-mode Voice, Maint. Bit Sync, C-Ch BER Meas./Acc. -- Sections 2.4.4.2.1, 2.4.4.2.8, 2.4.4.2.10, 2.4.4.2.13, 2.4.4.2.14 119
Figure 2-19 Sensitivity and Desired Signal Dynamic Range -- Sections 2.4.4.2.2 and 2.4.4.2.5 121
Figure 2-20 Image/Spur. Resp. Rej. / Rej. of Signals Outside AES Rcv Band -- Section 2.4.4.2.3 .. 122
Figure 2-21 Receiver Linearity -- Section 2.4.4.2.4 126
Figure 2-22 Receiver Tuning -- Section 2.4.4.2.6 127
Figure 2-23 Capture Range and Doppler Rate -- Section 2.4.4.2.7 129
Figure 2-24 Time to Acquire Superframe Lock -- Section 2.4.4.2.9 131
Figure 2-25 C-channel Bit Timing Recovery and Frame Lock Acquisition & False Frame Lock -- Sections 2.4.4.2.11, 2.4.4.2.12 133
Figure 2-26 Channel Rates and Tolerance -- Section 2.4.4.3.1 137
Figure 2-27 Output Power, Adjustment, and Stability -- Sections 2.4.4.3.2, 2.4.4.3.3, 2.4.4.3.4 138
Figure 2-28 Harmonics, Spurious, and Noise -- Section 2.4.4.3.5 141
Figure 2-29 Intermodulation Products -- Section 2.4.4.3.6 143
Figure 2-30 Carrier off Level -- Section 2.4.4.3.7 144
Figure 2-31 Transmitter Muting and Signal Spectrum -- Sections 2.4.4.3.8 and 2.4.4.3.16 145
Figure 2-32 Load Vswr Capability -- Section 2.4.4.3.9 146
Figure 2-33 Tuning Range & Channel Incrs, Frequency Acc, Doppler Corr, Doppler Rate Capability -- Sections 2.4.4.3.10, 2.4.4.3.13, 2.4.4.3.14, 2.4.4.3.15 148
Figure 2-34 Tuning Stabilization Time -- Section 2.4.4.3.11 150
Figure 2-35 Phase Noise -- Section 2.4.4.3.12 151
Figure 2-36 Transmit Pulse Shaping Filter Response - Section 2.4.4.3.17 156
Figure 2-37 SSN Data Link Layer & Pkt-mode Data Svc Tests -- Sec 2.4.5, 2.4.6, 2.4.7, 2.4.8 158
Figure 2-38 VCTS Test Configuration - Section 2.4.8 201
Figure B-1 An Example of an AES Receive Chain B-1

Page

TABLE OF TABLES

Table 2-1 AMSS Packet-mode Connection Precedence Mapping 49
Table 2-2 DCE Actions at State Transition 62
Table 2-2 DCE Actions at State Transition (Continued) 63
Table 2-3 DCE Special Cases 64
Table 2-4 DTE Effect on DCE Restart States 65
Table 2-4 DTE Effect on DCE Restart States (Continued) 66
Table 2-5 DTE Effect on DCE Call Setup and Clearing States 67
Table 2-5 DTE Effect on DCE Call Setup and Clearing States (Continued) 68
Table 2-6 DTE Effect on DCE Reset States 69
Table 2-7 DTE Effect on DCE Interrupt Transfer States 70
Table 2-8 DTE Effect on Flow Control Transfer States 71
Table 2-8 DTE Effect on Flow Control Transfer States (Continued) 72
Table 2-9 [Reserved] 72
Table 2-10 [Reserved] 72
Table 2-11 [Reserved] 72
Table 2-12 [Reserved] 72
Table 2-13 DCE Timer 74
Table 2-14 Circuit-mode Priority Structure 78
Table 2-15 Performance versus Test Requirement Matrix 85
Table 2-15 Performance versus Test Requirement Matrix (Continued) 86
Table 2-15 Performance versus Test Requirement Matrix (Continued) 87
Table 2-15 Performance versus Test Requirement Matrix (Continued) 88
Table 2-15 Performance versus Test Requirement Matrix (Continued) 89
Table 2-16 Scatter Power Densities for Multipath Analysis 110
Table 2-17/1 Cross-reference Matrix for Section 2.4.5 159
Table 2-17/2 Cross-reference Matrix for Section 2.4.5 160
Table 2-17/2 Cross-reference Matrix for Section 2.4.5 (Continued) 161
Table 2-18 Cross-reference Matrix for Section 2.4.6 165
Table 2-18 Cross-reference Matrix for Section 2.4.6 (Continued) 166
Table 2-18 Cross-reference Matrix for Section 2.4.6 (Continued) 167
Table 2-19 Cross-reference Matrix for Section 2.4.7 169
Table 2-19 Cross-reference Matrix for Section 2.4.7 (Continued) 170
Table 2-19 Cross-reference Matrix for Section 2.4.7 (Continued) 171
Table 2-19 Cross-reference Matrix for Section 2.4.7 (Continued) 172
Table 2-20 Cross-reference Matrix for Section 2.4.8 203
Table 2-20 Cross-reference Matrix for Section 2.4.8 (Continued) 204
Table 2-21 Cross-reference Matrix for Section 2.4.8 (4.8 kbps Vocoder) 204
Table 2-21 Cross-reference Matrix for Section 2.4.8 (4.8 kbps Vocoder) (Continued) 205

1.0 PURPOSE AND SCOPE

1.1 Introduction

This document contains minimum operational performance standards (MOPS) for Aeronautical Mobile Satellite Services (AMSS) operating in the frequency bands 1.5 and 1.6 GHz. These standards specify system characteristics that should be useful to designers, manufacturers, installers and users of the AMSS system and equipment.

Compliance with these standards is recommended as one means of assuring that the AMSS will perform its intended function(s) satisfactorily under all conditions normally encountered in routine aeronautical operations. Any regulatory application of this document is the sole responsibility of appropriate governmental agencies.

This document encompasses standards and descriptions of a system configuration including Ground Subnetworks; AMSS Satellite Subnetworks, of which the Aircraft Earth Station (AES) is one part; and Aircraft Subnetworks. However, the specified Minimum Operational Performance Standards in this document address only the AES portion of the Satellite Subnetwork.

The MOPS covers typical AMSS avionics requirements and tests for the AES. It includes the purpose, scope and equipment performance requirements; recommended bench tests and other performance verification procedures; and installed-equipment tests and operational performance characteristics. A companion document, RTCA DO-215A, *Guidance on AMSS End-to-End System Performance and Verification Requirements*, covers transmission characteristics for end-to-end AMSS service criteria of the network(s), including the remaining portions of the satellite subnetwork (the Ground Earth Stations (GES) and the satellite transponders), the Avionics Subnetworks interfacing with the AES and Ground Subnetworks that interface with the GES (see Figure 1-1).

Section 1.0 of this document provides information needed to understand the rationale for AMSS equipment and system characteristics and requirements stated in the remaining sections. It describes typical applications and operational goals as envisioned by the members of Special Committee 165 and establishes the basis for the standards stated in Sections 2.0 through 3.0. Definitions and assumptions essential to proper understanding of this document are also provided in this section, while a more extensive glossary appears as Appendix A.

Section 2.0 contains the minimum performance standards for the AES. These standards specify the required performance under standard and environmental conditions. Also included are recommended bench test procedures necessary to demonstrate equipment and network compliance with the stated minimum requirements.

© RTCA, Inc. 2000