

**ATIS-0100503.2002**

(Formerly T1.503-2002, Revision of T1.503-1996)

American National Standard for Telecommunications

## **Network Performance Parameters for Dedicated Digital Services -- Definitions and Measurements**

Secretariat

**Alliance for Telecommunications Industry Solutions**

Approved February 15, 2002

**American National Standards Institute, Inc.**

### **Abstract**

This standard applies to Layer 1, dedicated digital services, which are characterized by established transmission paths (i.e., no access or disengagement functions). Therefore, this standard defines performance parameters relevant to the information transfer phase only. This standard provides a list of the performance parameters and measurement methods needed by users, vendors, and providers of dedicated digital communications services, to characterize the user-observable performance of these services (i.e., it does not address the causes of errors). It also provides a formula for arriving at the thresholds of performance that will indicate the transitions between the available and unavailable states. A given service will only reference those parameters or thresholds that are applicable to that service. The network-specific parameters are for performance allocation and network control. End users may use the concepts developed in this standard to measure end-user-to-end-user performance and availability.

## Foreword

The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the standard.

Accredited Standards Committee T1, Telecommunications serves the public through improved understanding between carriers, customers, and manufacturers. Technical Subcommittee T1A1 of Committee T1 develops and recommends standards, requirements, and technical reports related to the performance, reliability, and associated security aspects of communications networks, as well as the processing of voice, audio, data, image, and video signals, and their multimedia integration. T1A1 also develops and recommends positions on, and foster consistency with, standards and related subjects under consideration in other North American and international standard bodies.

ANSI guidelines specify two categories of requirements: mandatory and recommendation. The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages.

Suggestions for improvement of this standard are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, T1 Secretariat, 1200 G Street NW, Suite 500, Washington, DC 20005.

This standard was processed and approved for submittal to ANSI by Accredited Standards Committee on Telecommunications, T1. Committee approval of the standard does not necessarily imply that all members voted for its approval. At the time it approved this standard, the T1 Committee had the following members:

E.R. Hapeman, T1 Chair  
 W.R. Zeuch, T1 Vice-Chair  
 J.A. Crandall, T1 Director  
 S.M. Carioti, T1 Disciplines  
 S.D. Barclay, T1 Secretary  
 C.A. Underkoffler, T1 Chief Editor  
 W. Wycoff, T1A1 Technical Editor

### EXCHANGE CARRIERS

Organization Represented	Name of Representative
AT&T Wireless Services, Inc.	Peter Musgrave Brian Jan (Alt.)
BellSouth Telecommunications Inc.	W. J. M. Namara III Gregory Wos (Alt.)
Cable & Wireless	Celia Aparicio Foderick Dottin (Alt.)
Covad Communications Co.	Ron Marquardt David Rosenstein (Alt.)
Qwest	James L. Eitel Richard Prince (Alt.)
Rhythms	Rand Kennedy David Reilly (Alt.)
Rogers Wireless Inc.	Edward O'Leary Peter Oldfield (Alt.)
TBC Communications, Inc.	Chuck Bailey Bob Hall (Alt.)
Sprint – Local Telecom. Division	Leroy D. Kellogg

Organization Represented	Name of Representative
US Telecom Association (USTA)	Paul Hart Donald G. Bender (Alt.)
Verizon Communications	Josephine Gallagher James F. Baskin (Alt.)

### GENERAL INTEREST

Organization Represented	Name of Representative
BOPS Inc.	Ali S. Sadri, PhD
CSI Telecommunications	Michael S. Newman Thomas G. Croda (Alt.)
Cingular Wireless LLC	Don Zelmer Mark Grant (Alt.)
Defense Information Systems Agency	Don Choi
Golden Bridge Technology Inc.	Kourosh Parsa Karin Zickermann (Alt.)
LightSurf Technologies, Inc.	John Hansen Shekhar Kirani (Alt.)

Organization Represented	Name of Representative
Microcell Connexions	Venkatesh Sampath Besma Smida (Alt.)
National Communications System	Nicholas Andre F. McClelland (Alt.)
NTIA	Neal B. Seitz
Quintessent Communications Inc.	Dave Deutschman
Rural Utilities Service	Orren E. Cameron III Norberto Esteves (Alt.)
Tantivy Communications	Mel Woinsky Clifton J. Barber (Alt.)
Telcordia Technologies	Rick Harrison Cliff Halevi (Alt.)
Voicestream Wireless Corp.	Gary K. Jones Mark Younge (Alt.)

**INTEREXCHANGE CARRIERS**

Organization Represented	Name of Representative
AT&T	Charles A. Dvorak Percy Tarapore (Alt.)
Bell Canada	P. Norman Smith
Intelsat	Mark T. Neibert
Lockheed Martin Global Telecom	Prakash Chitre
Sprint – Long Distance Division	James Lord Al White (Alt.)
WorldCom	Yi-Shang Shen J. Martin Carroll (Alt.)

**MANUFACTURERS**

Organization Represented	Name of Representative
3COM	Fred Lucas James R. ... (Alt.)
Acterna	Michael Lewis
ADC Telecommunications Inc.	Nelson Zagalsky
Alcatel USA Inc.	... Sihar Ch... Dickerson (Alt.)
Aware, Inc.	Marcos Tzannes Richard L. Stuart (Alt.)
Beatnik, Inc.	Chris Grigg Chris Muir (Alt.)
Broadcom Corp.	Vladimir Oksman
Catena Networks Inc.	Ed Eckert Andy Weirich (Alt.)
Centillum Communications, Inc.	Dr. Syed Abbas Guozhu Long (Alt.)
Cisco Systems, Inc.	John McDonough John Krahnert (Alt.)
Conexant Systems, Inc.	Quentin C. Cassen Arun Arunachalam (Alt.)

Organization Represented	Name of Representative
Copper Mountain Networks	John Reister Jack Yang (Alt.)
dynamicsoft Inc.	Dean Willis Jonathan Rosenberg (Alt.)
Elastic Networks, Inc.	Patrick H. Stanley, P.E.
Ericsson Inc.	Bob Slocum Asok Chatterjee (Alt.)
Excelsus Technologies Inc.	William J. Buckley Don Robert House (Alt.)
Fujitsu America Inc.	Mike White Hirohiko Yamamoto (Alt.)
Globespan Semiconductor, Inc.	Massimo Sorbara Clete Gardenhour (Alt.)
Harris Corp.	Marlis Humphrey
Hekimian Laboratories	William H. D... an
Hewlett-Packard	Steve Miller ... nugginbottom (Alt.)
Hughes Network Systems, Inc.	Dr. Leonard Golding Enrique Laborde (Alt.)
IBM Corp.	Jeff H. Derby Evangelos Eleftheriou (Alt.)
Juniper Networks Inc.	Elizabeth Lytle
Lucent Technologies	Greg Ratta Rick Townsend (Alt.)
Luxxon Corp.	Tao Lin Bert Rackett (Alt.)
Marconi Communications	Clim Kamdar Les Murray (Alt.)
Metawave Communications Corp.	Shimon Scherzer
Motorola Inc.	Ken Skurnak Syed Niaz (Alt.)
NEC America Inc.	Dia Helmy
Next Level Communications	Sabit Say Todd Pett (Alt.)
Nokia Telecommunications Inc.	Chris Wallace Margaret Livingston (Alt.)
Nortel Networks	Subhash Patel Joseph A. Zebarth (Alt.)
Octasic, Inc.	Serge Fournier Thomas Awad (Alt.)
Ocular Networks, Inc.	Ron Fang Chris Roller (Alt.)
OKI America Inc.	Henri Suyderhoud Hisao Fujikawa (Alt.)
Panasonic-MMCD	Mike Karimian Rob Winstanley (Alt.)
Paradyne Corp.	Phil Kyees
PMC-Sierra, Inc.	Steve Gorshe
Qualcomm Inc.	Mark Epstein Ed Tiedemann (Alt.)
RealNetworks	Jeremy Worley



ATIS-0100503.2002

Garry Couch, Telcordia Technologies; T1A1.3 Chair

Henri Suyderhoud, OKI America, Incorporated; T1A1.3 Vice-Chair

Organization Represented	Name of Representative
Oscar Avellaneda	Nortel Networks
Ken Biholar	Alcatel USA
John Boal	MEGAXESS, Inc.
Dick Bobilin	Acterna
David Brady	BellSouth
Rick Canaday	AT&T
Ron Carlson	Infinitec Networks
Art Chavez	DISA
Don Choi	DISA
Dave Curtis	AT&T
Chuck Dvorak	AT&T
Suhas S. Gandhi	Siemens Carrier Networks
Geoffrey Garner	Lucent Technologies
Brad Gilmer	Video Services Forum
John Grigg	Qwest
Glenn Grotefeld	Motorola, Inc.
Eric Hauch	BellSouth
Rashid Jamal	Sprint
Fred Kaudel	Fluke Networks, Inc.
Granger Kelley	ARTEL, Inc.
Miroslav I. Klun	Verizon Laboratories
Mustafa Kocaturk	Ericsson
Richard Liberman	Acterna

Organization Represented	Name of Representative
James Liou	MCI
Jim Lord	Sprint - LDD
Alfred Morton	AT&T
Mark Neibert	INTELSAT
Mike Pierce	ARTEL, Inc.
Paul Randall	Delta Information Systems
S. Arshad Razvi	Qwest Communications
Doug Richards	Sprint
John Roquet	SBC TRI
Neal B. Seitz	NT&M
Peter Shelus	Telcordia Technologies
Kevin Stodola	Te Labs
Steve Storozum	Zuma Networks, Inc.
Randolph Wohler	SBC
Bernard Worne	Acterna
Greg A. Wos	BellSouth Telecommunications
William K. Wycoff	Qwest Communications
Wing-Chong Yeung	Qualcomm, Inc.
Joseph Zearth	Bell Canada
Kevin Zhang	Lockheed Martin Global Telecommunications

**Table of Contents**

**1 SCOPE, PURPOSE, AND APPLICATION .....1**

**2 NORMATIVE REFERENCES .....1**

**3 ABBREVIATIONS, ACRONYMS, AND DEFINITIONS.....2**

3.1 ABBREVIATIONS & ACRONYMS.....2

3.2 DEFINITIONS.....3

**4 FUNCTIONAL REFERENCE MODELS.....4**

5.1 ACCURACY PARAMETERS .....6

5.2 AVAILABILITY PARAMETERS .....6

5.2.1 AVAILABILITY DEFINITIONS.....7

5.2.2 DETERMINATION OF BIDIRECTIONAL AVAILABILITY.....7

**6 MEASUREMENTS.....8**

6.1 MEASUREMENT PURPOSES.....8

6.2 TYPES OF MEASUREMENTS.....8

6.3 PERFORMANCE DETERMINATION .....8

6.4 IN-SERVICE MEASUREMENT OF AVAILABILITY.....9

6.4.1 MEASURING AVAILABILITY BETWEEN TWO INIS .....9

MEASURING AVAILABILITY FROM NI-TO-NI .....10

**A BIBLIOGRAPHY.....11**

**Table of Figures**

FIGURE 1 – REFERENCE MODELS .....5

FIGURE 2 – MONITORING POINTS FOR AVAILABILITY BETWEEN TWO INIS .....9

FIGURE 3 – MONITORING POINTS FOR AVAILABILITY FROM NI-TO-NI .....10

**Table of Tables**

TABLE 1 – RELATIONSHIP OF THE ACCURACY ELEMENTS TO THE INTERVALS AND THRESHOLDS .....9