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SERIES M: TMN AND NETWORK MAINTENANCE: INTERNATIONAL TRANSMISSION SYSTEMS, TELEPHONE CIRCUITS, TELEGRAPHY, FACSIMILE AND LEASED CIRCUITS

International transport network

Performance limits for bringing-into-service and maintenance of international SDH paths and multiplex sections

ITU-T Recommendation M.2101.1

(Previously CCITT Recommendation)

ITU-T M-SERIES RECOMMENDATIONS

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ITU-T RECOMMENDATION M.2101.1

PERFORMANCE LIMITS FOR BRINGING-INTO-SERVICE AND MAINTENANCE OF INTERNATIONAL SDH PATHS AND MULTIPLEX SECTIONS

Summary

This Recommendation provides limits for bringing-into-service and maintenance for international SDH paths and international SDH multiplex sections. Error, timing and availability performance events are addressed. This Recommendation also deals with all levels of PDH signals transported within SDH containers.

Source

ITU-T Recommendation M.2101.1 was prepared by ITU-T Study Group 4 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 19th of April 1997.

Keywords

Allocated Performance Objective (APO), Bringing-Into-Service (BIS), Bringing-Into-Service Performance Objective (BISPO), Degraded Performance Limit (DPL), Errored Second (ES), Limits, Maintenance, Performance Objectives, Severely Errored Second (SES), Unacceptable Performance Limit (UPL).

FOREWORD

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NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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CONTENTS

Introduction

This Recommendation provides limits for bringing-into-service, and limits for maintenance of international SDH paths and international SDH multiplex sections in order to achieve the performance objectives given for a multiservice environment. These objectives include error performance (Recommendation G.826), timing performance (Recommendation G.822) and availability (Recommendation G.827). This Recommendation defines the parameters and their associated objectives in order to respect the principles given in Recommendations M.20, M.32 and M.34. "International" in this Recommendation refers to SDH paths and multiplex sections which cross international boundaries with a change in jurisdictional responsibility.

The methods and procedures for applying these limits are described in Recommendation M.2110 for the bringing-into-service procedures and in Recommendation M.2120 for the maintenance procedures.

This Recommendation uses certain principles which are the basis of the maintenance of a digital network:

– It is desirable to do in-service, continuous measurements. In some cases, out-of-service measurements may be necessary.

– A single set of parameters must be used for maintenance of the SDH hierarchy (however the actual limits are bit rate dependent).

– Error performance limits of international SDH paths and multiplex sections are dependent on the medium used.

This Recommendation covers the error performance limits and in-service and out-of-service parameter evaluation criteria for SDH paths and multiplex sections.

Recommendation M.2101.1

PERFORMANCE LIMITS FOR BRINGING-INTO-SERVICE AND MAINTENANCE OF INTERNATIONAL SDH PATHS AND MULTIPLEX SECTIONS

(Geneva, 1997)

1 Scope

Within the scope of this Recommendation are bringing-into-service and maintenance of international SDH paths and multiplex sections and also SDH signals transported over PDH networks. For the case of PDH signals transported over SDH networks, Recommendation M.2100 applies to the PDH part, and this Recommendation applies to the SDH part. Further guidance is given in the main body of this Recommendation on how M.2100 and M.2101.1 relate. "International" in this Recommendation refers to SDH paths and multiplex sections which cross international boundaries with a change in jurisdictional responsibility.

This Recommendation does not consider commissioning of SDH equipment into the network. The lowest bit-rate considered by this Recommendation is the SDH VC1 bit rate. It does not, therefore, consider 64 kbit/s circuits or sub-64 kbit/s which are dealt with by Recommendations M.2100 and M.1340, respectively.

The SDH signal format and structure is described in Recommendation G.707. The long-term error performance objectives for SDH networks are given in Recommendation G.826.

For availability performance, Recommendation G.827 provides the long-term requirements. Availability performance requirements from a short-term maintenance perspective are under study.

Recommendation G.803 provides a modeling method for describing the functions which exist or are required to make up a telecommunications network. This modeling method has been used where appropriate within this Recommendation.

Limits for BIS and maintenance are given for Virtual Containers (VC) and Synchronous Transport Module-N (STM-N). Limits are also given for triggering maintenance activity (e.g. repair, fault localization, etc.).

Methods of deriving performance information from Bit Interleaved Parity-Ns (BIP-N) and other path overhead information are given. Tandem connection monitoring is not considered in this Recommendation, but may be introduced in the future. Automatic Restoration/Protection events are considered. The guidance given in this Recommendation in terms of performance limits for maintenance purposes, and that given in the companion Recommendations M.2110 and M.2120 provide a consistent platform from which the requirements for a maintenance management system can be derived.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

[1] CCITT Recommendation G.702 (1988), *Digital hierarchy bit rates*.

[2] CCITT Recommendation G.703 (1991), *Physical/electrical characteristics of hierarchical digital interfaces*.

[3] ITU-T Recommendation G.707 (1996), *Network node interface for the Synchronous Digital Hierarchy (SDH).*

[4] ITU-T Recommendation G.782 (1994), *Types and general characteristics of Synchronous Digital Hierarchy (SDH) equipment*. [NOTE – Recommendation G.782 has been replaced by Recommendation G.783 (1997).]

[5] ITU-T Recommendation G.783 (1997), *Characteristics of Synchronous Digital Hierarchy (SDH) equipment functional blocks.*

[6] ITU-T Recommendation G.803 (1997), *Architectures of transport networks based on the Synchronous Digital Hierarchy (SDH).*

[7] CCITT Recommendation G.822 (1988), *Controlled slip rate objectives on an international digital connection*.

[8] ITU-T Recommendation G.825 (1993), *The control of jitter and wander within digital networks which are based on the Synchronous Digital Hierarchy (SDH).*

[9] ITU-T Recommendation G.826 (1996), *Error performance parameters and objectives for international, constant bit-rate digital paths at or above the primary rate*.

[10] ITU-T Recommendation G.827 (1996), *Availability parameters and objectives for path elements of international constant bit-rate digital paths at or above the primary rate*.

[11] Draft Recommendation G.EPMRS, [*Error performance events for SDH multiplex and regenerator sections* has not yet a definite G-Series number and the text is not yet published.]

[12] CCITT Recommendation M.20 (1992), *Maintenance philosophy for telecommunications networks*.

[13] CCITT Recommendation M.32 (1988), *Principles for using alarm information for maintenance of international transmission systems and equipment*.

[14] CCITT Recommendation M.34 (1988), *Performance monitoring on international transmission systems and equipment*.

[15] ITU-T Recommendation M.2100 (1995), *Performance limits for bringing-into-service and maintenance of international PDH paths, sections and transmission systems*.

[16] ITU-T Recommendation M.2110 (1997), *Bringing-into-service of international PDH paths, sections and transmission systems and SDH paths and multiplex sections*.

[17] ITU-T Recommendation M.2120 (1997), *PDH path, section and transmission system and SDH path and multiplex section fault detection and localization procedures.*

[18] ITU-T Recommendation M.1340 (1996), *Performance allocations and limits for international data transmission links and systems*.

[19] ITU-T Recommendation O.150 (1996), *General requirements for instrumentation for performance measurements on digital transmission equipment.*

[20] ITU-T Recommendation O.181 (1996), *Equipment to asses error performance on STM-N interfaces*.

3 Definitions

This Recommendation defines the following terms.

3.1 Usage of the terms "path" and "multiplex section" in this Recommendation

In this Recommendation, the terms "path" and "multiplex section" describe unidirectional transport entities. For a bi-directional path or multiplex section all objectives, limits, etc. should be applied to each direction of the trail independently from the other direction. This means that for maintenance purposes, performance events occurring on the A-Z direction shall not have any impact on the evaluation of performance events occurring on the Z-A direction, and vice versa.

3.2 Definition of performance objectives

3.2.1 performance objective (PO): Performance objective for the international portion of the hypothetical reference path (see Figure 3/G.826) or multiplex section.

3.2.2 allocated performance objective (APO): Performance objective for a real path calculated according to the allocation rules.

3.2.3 bringing-into-service performance objective (BISPO): Bringing-into-service performance objective for a real path or multiplex section calculated from its APO.

3.3 Definition of international portion

An international digital path can be subdivided into two national portions and one international portion. The boundary between these portions is defined to be an International Gateway (IG).

IG: International VC-*n* Sink/Source equipment [or VC-4 in case of interconnected networks based on different Administrative Units (AU)].

The international portion of an end-to-end path begins in one terminating country and ends in the second terminating country. It is not possible to have less than or more than two terminating countries for an international portion.

The national portion is outside the scope of this Recommendation.

3.4 Path Core Elements

An international digital path has been partitioned in geographical terms for the purpose of allocating the Performance Objectives (POs). These portions have been titled Path Core Elements (PCEs).

Two types of international PCE are used:

– an International Path Core Element (IPCE) is between an IG and a Frontier Station (FS) in a terminating country, or between FSs in a transit country (see definition of IG in 3.3);

– an Inter-Country Path Core Element (ICPCE) is between the agreed frontier stations of the two countries involved. The ICPCE corresponds to the highest-order digital standardized trail carried on a digital transmission system linking the two countries. An ICPCE may be transported on a terrestrial, satellite or undersea cable transmission system.

There are two cases where a country may not contain an IPCE:

– depending on the geographical situation and network topology, the IG may coincide with the FS in a terminating country;

– the path uses only one FS in a transit country.

3.5 The international boundary and border crossing points

The International Boundary, the point at which control transfers from one international operator to the next international operator, normally exists within the ICPCE. Generally, this would be half-way along a submarine cable or terrestrial border crossing ICPCE. The Border Crossing Point may coincide with the International Boundary (for example, for a terrestrial border crossing ICPCE) or, in the case of a submarine cable (for example), there would be two border crossings, corresponding to the coastline of the operator's country, which would not coincide with the International Boundary.

3.6 International paths operating in tandem

International paths may operate in tandem where network topology requires links between certain terminating countries to be established. The restriction is that the allocation must not exceed the 63% allocated to the international portion of a path by Recommendation G.826.

3.7 Definition of in-service measurement points

The full definitions of sections and paths are given in Recommendation G.803. The following definitions are for use with this Recommendation, and are for guidance only. See also Figure 1 and Figure 3-10/G.803 for an illustration of these objects.

3.7.1 STM-N section layer

This includes the following:

3.7.1.1 STM-N section network connection

This provides the link between STM-N Section Network Connection termination points. Examples include point-to-point submarine cables and border crossings. This is the highest bit-rate part of the SDH transmission network. It would not normally be possible to make any measurements of this.

3.7.1.2 STM-N section trail

This is the STM-N Section Network Connection and its termination points. Since this includes termination points, measurements can be made.

This Recommendation gives performance limits for international STM-N multiplex section trails, which will be the case for some submarine cables, satellite links or terrestrial border crossings. Where STM-N section trails are operating in tandem across a given operator's territory to make up its Path Core Element, it is the responsibility of the operator to ensure that the performance of the Section Trails operating in tandem meets the requirements for its Path Core Element, as given in this Recommendation.

3.7.1.3 STM-N termination point

This terminates the STM-N Section Network Connection, and interfaces with the adaptation function. At this point, the STM-N Section Overhead is removed.

3.7.1.4 STM-N adaptation function

This multiplexes between the Higher-Order Path Layer and the STM-N Section layer. It interfaces the STM-N Termination point with either the Higher-Order Path Trail termination point or a Higher-Order Path Sub-network Connection.

3.7.2 Higher-Order Path Layer

This includes the following:

3.7.2.1 Higher-Order Path Sub-network connection

This provides connectivity between STM-N/HOPL adaptation functions, permitting higher-order VCs (VC-3[1], VC-4) to be connected between STM-N Section Trails. This type of connection would normally be provided by add-drop multiplexers or cross-connects.

3.7.2.2 Higher-Order Path trail

This exists between and includes the Higher-Order Path Termination Points. Since it is terminated, measurements can be made over this trail. It is made up of one or more STM-N Section Trails operating in tandem, and therefore also includes none or more Higher-Order Path Sub-Network Connections.

Performance limits for Higher-Order path trails (VC-3s and VC-4s) will only be given by this Recommendation when the VC-3 or VC-4 is the end-to-end path solely under consideration, or when the Higher-Order Path Trail corresponds directly to a Path Core Element. In the case where one operator's Path Core Element is made up of a number of Higher-Order path trails operating in tandem, it is the responsibility of that operator to ensure that the performance of those trails operating in tandem meets the performance limit for its PCE.

3.7.2.3 Higher-Order adaptation function

This multiplexes between the higher-order path layer (a given higher-order path trail) and the lower-order path layer, interfacing to the higher-order trail termination points, and either the lower-order trail termination point or to a Lower-Order Path Sub-network Connection.

3.7.3 Lower-Order Path Layer

This includes the following:

3.7.3.1 Lower-Order Path Sub-network connection

This provides a link between higher-order to lower-order path layer adaptation functions. This link would normally exist inside equipment such as an add-drop multiplexer or cross-connect. It allows higher-order path trails to operate in tandem in order to make up a Lower-Order path trail.

3.7.3.2 Lower-Order Path trail

This exists between and includes the Lower-Order Path Trail Termination Points, where the VC-1, -2 or -3 overhead is removed. Measurements can therefore be made of this object. Performance limits are given in this Recommendation for Lower-Order Path Trails.

4 Abbreviations

This Recommendation uses the following abbreviations:

AIS Alarm Indication Signal

APO Allocated Performance Objective

AU Administrative Unit

BBE Background Block Error

BER Bit Error Ratio

BIP Bit Interleaved Parity

BIS Bringing-Into-Service

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[1] Note that the Virtual Container 3-VC-3 can be considered to be either a lower-order or a higher-order VC.

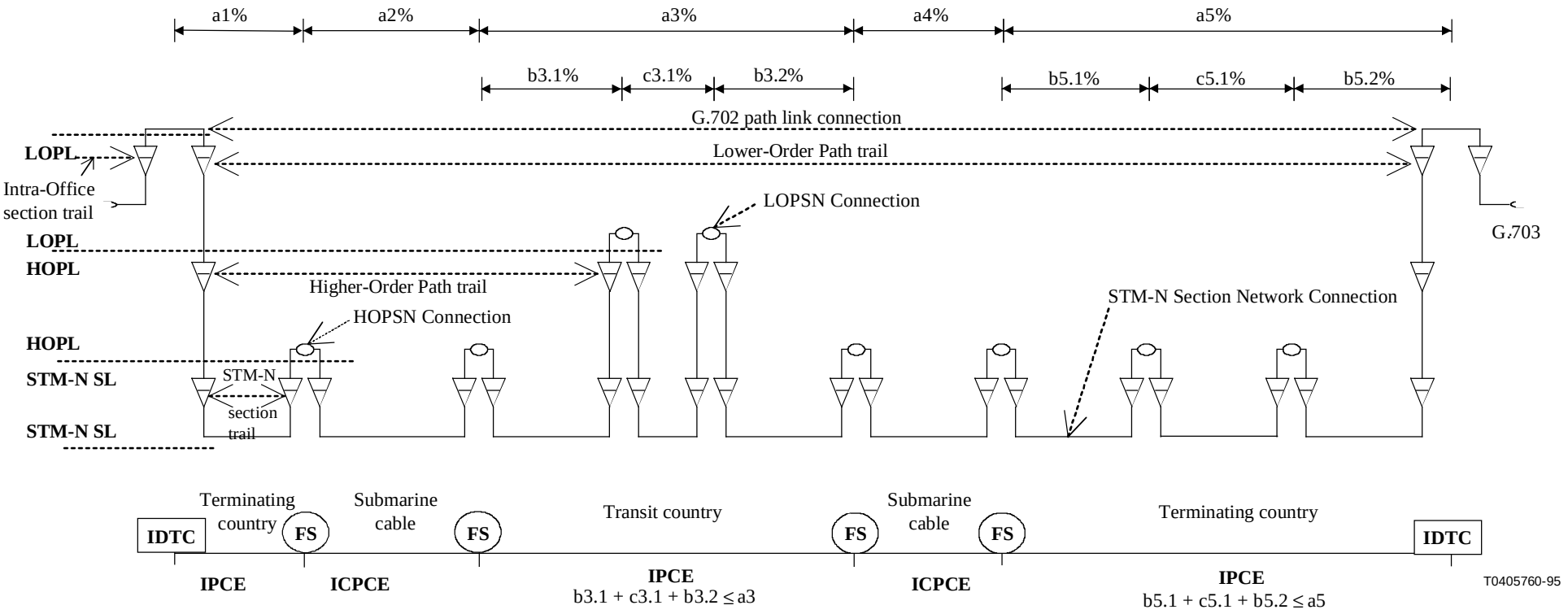
BISPO BIS Performance Objective
DPL Degraded Performance Limit
DXC Digital Cross Connect
ES Errored Second
FAS Frame Alignment Signal
FS Frontier Station
HOPL Higher-Order Path Layer
IB International Border
ICPCE Inter-Country Path Core Element
IDTC International Digital Transmission Center
IG International Gateway
IPCE International Path Core Element
IS In-Service
LOF Loss Of Frame
LOP Loss Of Pointer
LOPL Lower-Order Path Layer
LOS Loss of Signal
MS Multiplex Section
OOS Out-of-Service
PCE Path Core Element
PDH Plesiochronous Digital Hierarchy
PEP Path End Point
PO Performance Objective
PRBS Pseudo-Random Binary Sequence
rf routing factor
RS Regenerator Section
SDH Synchronous Digital Hierarchy
SES Severely Errored Second
STM Synchronous Transport Module
TSS Test Signal Sequence
UPL Unacceptable Performance Limit
VC Virtual Container

5 Conventions

PO is used for reference performance objective for both ES and SES unless only one is specifically indicated.

6 Hypothetical reference model for performance of international path and multiplex section layers

The physical relationship between the international LOPL, HOPL and STM-N Section Layers is illustrated in Figure 1.

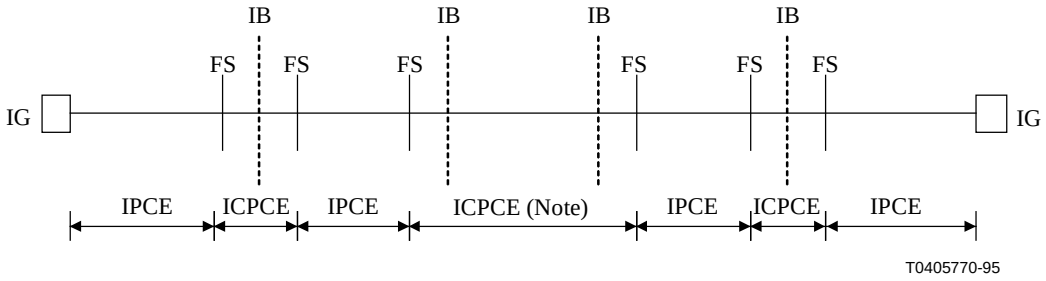


NOTE 1 – According to Recommendation G.826, the Allocated Performance Objective of the international portion must not exceed 63% of the Performance Objective.
NOTE 2 – A common international portion consists of two terminating countries (IPCEs), and one submarine cable, satellite system or terrestrial border crossing (ICPCE). The physical end points of the international portion exist within IDTCs; the IDTC corresponds to one of the IGs (International Gateways) as given in Recommendation G.826.
NOTE 3 – More complex path structures may include transit countries, which would exist between the two terminating countries linked by IPCE (terrestrial border crossings, submarine cables or satellite links). ICPCEs operating in tandem are acceptable (e.g. submarine cables operating in tandem).
NOTE 4 – This international path allocation shows the relationship between Path Core Elements and Recommendation G.803 network modelling. Please see Figure 4-1/G.803 for a precise network model.

Figure 1/M.2101 – Example of apportionment for an international path

7 Allocation principles of end-to-end VC connections

This clause specifies the allocation of error performance objectives for the international portion of international digital paths, in terms of PCEs as shown in Figure 2.



IG International Gateway
FS Frontier Station
IB International Border

NOTE – This ICPCE crosses two intenational borders and is typically on a satellite or undersea cable transmission system.

Figure 2/M.2101.1 – Example of the components of a path to show PCEs

It is the responsibility of each country to design its network in a way that is consistent with its PCE country allocation for the international path. The allocation of each portion of the international path can be determined from the values given in Table 2A; the allocation for multiplex sections is given in Table 2B. These allocations are a percentage of the end-to-end PO. Distances referred to in Tables 2A and 2B are actual distances, or great circle (also called air-route or air-mile) distances multiplied by the routing factor (rf), whichever is less.

Table 1/M.2101.1 – PCE great circle length vs. routing factor

PCE great circle length	Routing Factor (rf)
d ≤ 1000 km	1.5
d > 1000 km	1.25

As shown in Figure 1, it is possible that access to the bit stream for a given path may not coincide with the end of a PCE. In this case, or if a transit country has other access points within its network, it may be necessary to make a sub-allocation for maintenance purposes, e.g. fault localization as described in Recommendation M.2120. Such sub-allocations will be the responsibility of the national network operator(s) of the country involved, with the following constraints:

– the sum of sub-allocations may not exceed the allocation of Table 2A for the PCE in question;

– the values of the sub-allocations must be communicated to all maintenance centres involved before bringing the path into service and after any rearrangement which changes the values.

Table 2A/M.2101.1 – Maximum allocation of PO to Path Core Elements

PCE classification	Allocation (% of end-to-end PO)
IPCE	
Terminating/Transit national network:	
d ≤ 500 km	2
500 km < d ≤ 1000 km	3
1000 km < d ≤ 2500 km	4
2500 km < d ≤ 5000 km	6
5000 km < d ≤ 7500 km	8
d > 7500 km	10
ICPCE (Note)	
Optical undersea cable:	
d ≤ 500 km	1
d > 500 km	2.5
Satellite:	
Normal operation	FFS
Wideband cable restoration mode	FFS
Terrestrial:	
d < 300 km	0.3
NOTE – ICPCE allocations must be met regardless of how many MS make up the ICPCE.	

Table 2B/M.2101.1 – Maximum allocation of PO to international multiplex sections

Facility type	Allocation (% of end-to-end PO)
Terrestrial	0.2
Satellite	FFS
Optical undersea cable	
d ≤ 500 km	0.2
d > 500 km	0.5

7.1 VC connections using rings

For the purpose of calculation of error performance limits for paths transported by SDH rings, the Path End Points should first be identified, and then the performance allocated in the normal way, using the air-route distance multiplied by the routing factor. This will result in only one set of error performance limits independently of the direction around the ring (the clockwise direction, or the anti-clockwise direction).

8 Performance objectives

The values given in Table 3 are 50% of the Recommendation G.826 values for paths in order to provide some margin for maintenance purposes.

Table 3/M.2101.1 – Performance objectives for end-to-end international trails

	Performance Objectives (PO)	
Bit rate: Mbit/s	**ES % of time**	**SES % of time**
1.5 < rate ≤ 5 5 < rate ≤ 15 15 < rate ≤ 55 55 < rate ≤ 160	2 2.5 3.75 8	0.1 0.1 0.1 0.1
160 < rate ≤ 3500	NA (Note)	0.1
> 3500	NA (Note)	0.1
NA Not Applicable NOTE – The BBE could be used for maintenance purposes. This issue is for further study.		

For this Recommendation SDH signals are evaluated end-to-end such that the ES and SES evaluations are in accordance with Recommendation G.826 for paths. Each Virtual Container termination point will calculate the ES and SES counts for the end-to-end Virtual Container. For multiplex sections, ES and SES evaluations are in accordance with Recommendation G.EPMRS.

End-to-end performance over any trail or connection can only be calculated from whatever signal (e.g. VC or STM) whose source and sink points coincide with the ends chosen for the measurement. Aggregation of performance measurements of trails operating in tandem should only be used where there is no VC or STM source to sink measurement possible. This situation may occur, for example, where VC-1s operating in tandem have been used to make up the full end-to-end path transporting *N* times 64 kbit/s or primary rate PDH signals. In this case, the PDH Path Overhead evaluated results will provide a better guide to the end-to-end error performance of the path.

A PDH signal transported by an SDH container is evaluated end-to-end according to Recommendation M.2100. The SDH transport portion is evaluated according to this Recommendation.

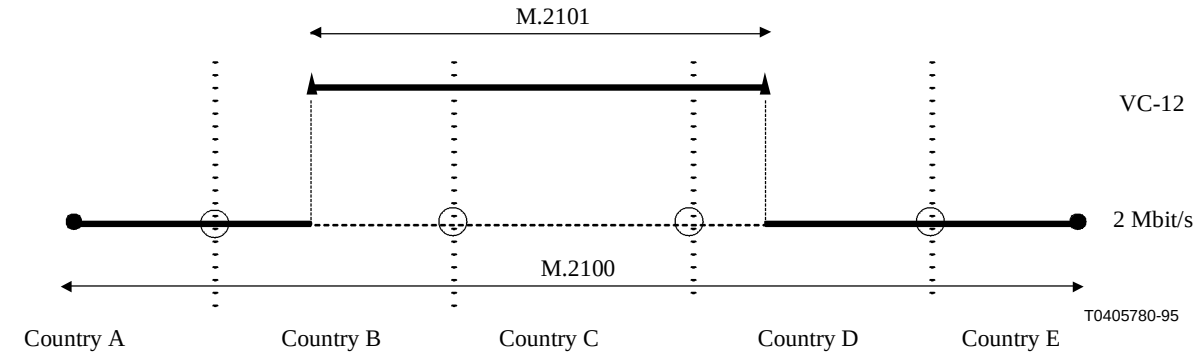
In the case where SDH containers are mapped into PDH frames, then this Recommendation should be applied. It is noted that in this case, PDH sub-networks may not be able to meet the more stringent requirements that this Recommendation's SDH path performance limits may impose. Appropriate allowance should be made while maintaining SDH containers transported via PDH sub-networks. See Figure 3 for more information.

8.1 Principles

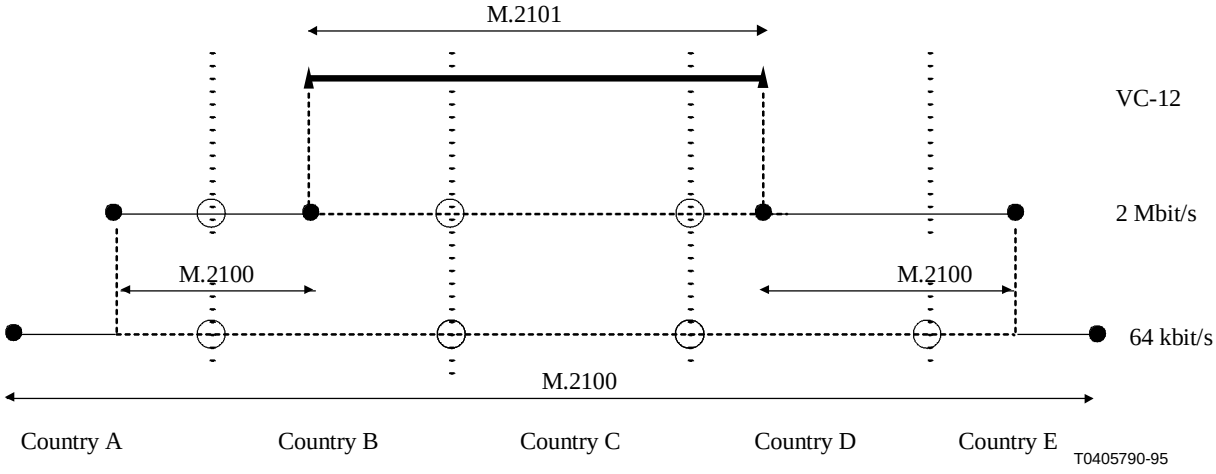
1) For a path between two SDH-PEPs, apply Recommendation M.2101.1.

2) For a path between two PDH-PEPs, apply Recommendation M.2100.

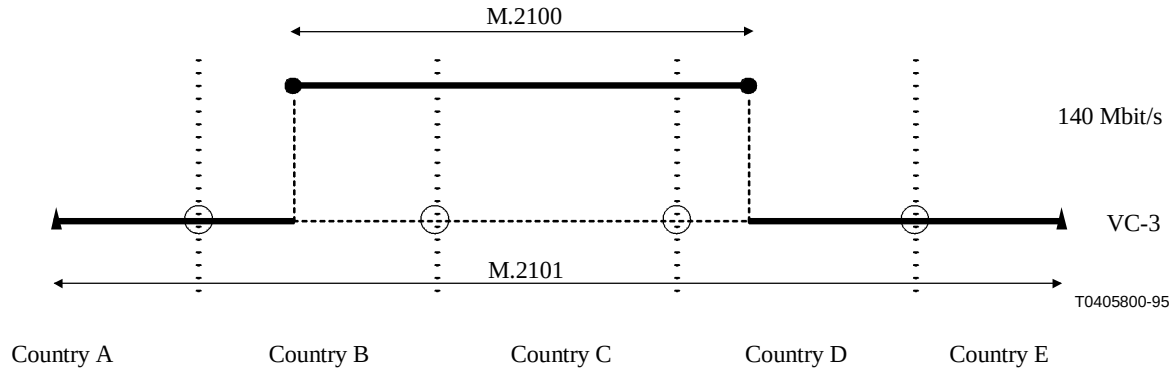
3) Recommendation M.2101.1 must be more stringent than Recommendation M.2100.



a) Asynchronous mapping of a 2 Mbit/s path into a VC-12



b) Synchronous mapping of 64 kbit/s paths into a VC-12



c) Mapping of a VC-3 into a 140 Mbit/s path

● Physical PDH-PEP ▲ Physical SDH-PEP ○ International border

Figure 3/M.2101.1 – Applications of Recommendations M.2100 and M.2101.1 for mixed SDH and PDH transmission

9 Evaluation of error performance parameters

9.1 Scope

This subclause addresses the evaluation of the error performances parameters (Recommendation G.826) using anomalies and defects (see definition in Recommendation M.20).

In-service evaluation is considered in 9.2 and out-of-service evaluation is considered in 9.3.

The treatment of the ES and SES counts during the unavailable state is explained in clause 12.

9.2 Evaluation of ES/SES parameters from in-service measurements

9.2.1 General

Both the ES and SES parameters are evaluated from in-service anomalies (see 9.2.2) and in-service defects (see 9.2.3) relevant to the path terminating equipment at the network level of interest over a one-second integration period.

9.2.2 In-service anomaly information

An "in-service anomaly" occurs on a path when there is an elemental change of the path overhead from its normal value without a change of state of the total path signal from its normal state, i.e. there is no in-service defect present.

See Annex C/G.826 for the list of performance-related in-service anomalies.

9.2.3 In-service defect information

An "in-service defect" occurs on a path when there is a change of state of the total path signal from its normal state. A particular in-service defect is evaluated from the persistence (i.e. integration period) of the relevant in-service anomalies; exact details (including any associated consequent actions) are given in the Recommendations dealing with the path termination function for the particular in-service defect considered.

See Annex C/G.826 for the list of performance-related in-service defects.

9.2.4 Remote anomaly and defect indication

Anomalies and defects detected by section and path terminating equipment are reported to the far-end terminating equipment every frame (125 μsec.) using a byte reserved for this purpose in the section and path overhead. Therefore, the in-service anomalies and defects described in 9.2.2 and 9.2.3 respectively, are available at the terminating equipment for the transmitted direction as well as the received direction.

9.2.4.1 ES and SES evaluation from in-service anomaly and defect information at path terminating equipment

This subclause shows how anomaly and defect event indicators may be processed into ES and SES parameters. Tables have been prepared for HO and LO Path Layer and the multiplex section layer.

Each table provides guidance for ES/SES evaluation criteria as follows:

– Table B.1 for LO Path Layer;

– Table B.2 for HO Path Layer;

– Table B.3 for multiplex section Layer.

Where applicable, return in-service anomaly or defect information from a remote path terminating equipment is included in the tables. This allows, when required, a single-ended both-direction monitoring capability.

9.3 Out-of-Service (OOS) measurements

9.3.1 General

OOS measurements are more accurate than IS measurements.

It may be necessary to generate a valid payload signal (i.e. there may be no traffic).

It may be necessary to stress-test systems using OOS signals with a defined range of variables, e.g. pulse densities, jitter, etc.

9.3.2 Possible OOS measurement methods

External O.181 compliant tester connected to SDH-NNI. This could be a transmitter, receiver or both, depending on test requirements.

External O.150-Series compliant tester[2] connected to PDH G.703 interface.

Internal O.150-Series compliant PRBS generator or receiver connected to the PDH adaptation function, or internal O.181 compliant test signal sequence (TSS) inserted into any G.707 container.

Assessment using existing IS PDH and/or SDH information to evaluate ES and SES but with no specific payload.

Each of the above methods may be used either per-direction or with a distant loop-back.

10 Performance limits

Performance limits relative to Allocated Performance Objective from a long-term perspective are given in Table 4.

10.1 General

10.1.1 Relationship between performance limits and objectives

The limits in this Recommendation are to be used to indicate the need for actions during maintenance and bringing into service. A network maintained to these limits should meet the performance objectives specified in the Recommendations G.826 and G.EPMRS.

The particular parameters measured, the measurement duration, and the limits used for the procedure need not be identical to those used for specifying the performance objectives as long as they result in network performance which meets these objectives. For example, the error performance objectives refer to long periods, such as one month. However, practical considerations demand that maintenance and BIS limits be based on shorter measurement intervals.

Statistical fluctuations in the occurrence of anomalies and defects means that one cannot be certain that the long-term objectives are met. The limits on the numbers of events and the duration of measurements attempt to ensure that multiplex sections or paths exhibiting unacceptable or degraded performance can be detected. The only way to ensure that a multiplex section or path meets network performance objectives is to evaluate continuous measurement over a long period (i.e. months).

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[2] When performing O.150-Series compliant tests, the evaluation criteria for ES and SES from anomalies and defects are given in Recommendation M.2100.

10.1.2 Types of limits

Limits are needed for several maintenance functions as defined in Recommendation M.20. This Recommendation provides limits for three of these functions:

– bringing-into-service;

– keeping the network operational (maintenance);

– system restoration,

for paths and multiplex sections.

Limits for commissioning (installation and acceptance) of multiplex sections are not provided in ITU-T Recommendations.

10.1.2.1 BIS Tests/Limits

When a particular path/section is brought into service, the collection of anomalies and defects for the BIS tests shall be done at the actual termination points of this path/section. See Recommendation M.2110 for further information. For newly equipped paths, long-term BIS tests should be used. For new paths on existing routes, shorter BIS tests may be sufficient.

10.1.2.2 Maintenance Limits

Once entities have been placed into service, supervision of the network requires additional limits, as described in Recommendation M.20. This supervision is done by in-service performance monitoring. The supervision process involves analyzing anomalies and defects detected by maintenance entities to determine if the performance level is normal, degraded, or unacceptable. Thus, degraded and unacceptable performance limits are required. In addition, a limit on performance after intervention (repair) is also required. It may be different from the BIS limit.

10.1.3 Process for calculation of path performance limits

The following steps shall be followed to obtain path performance limits:

1) Identify the bit rate of the path.

2) Read the PO for the appropriate bit rate from Table 3 for both ES and SES:

   PO_{es} = x%

   PO_{ses} = y%

3) Identify all PCEs for the entire path, and set N = the total number of PCEs.

4) Label the PCEs as PCE_1 to PCE_N as shown in Figure 1.

5) Identify the length, *d*, of each PCE_n [$n = 1$ to N]. The length, *d*, is either the actual path length or can be estimated by the great circle length between its endpoints multiplied by the appropriate routing factor from Table 1.

6) Read the allocation, a_n%, (as a percentage of end-to-end PO) for PCE_n [$n = 1$ to N] from Table 2A. Note that the allocations in Table 2A are maximum values; more stringent values can be used by bi-lateral or multi-lateral agreement.

7) Calculate A%, the path allocation, where:

$$A\% = \sum_{n=1}^{N} a_n\%; \quad \text{i.e. } = a_1\% + a_2\% + \cdots + a_N\%$$

At this point, the BISPO, s1, s2 and UPL values can be read from the tables given in Annexes C and D. Alternatively, the following steps can be used to calculate those values:

8) Determine the required Test Period, (TP) where TP = 15 min., 2 hours, 24 hours, or 7 days.

Express TP in seconds, e.g. TP = 900 seconds for a 15-minute test.

9) Calculate the APOs (Allocated Performance Objectives) required from the information already obtained:

$$APO_{es} = A\% \times PO_{es} \times TP$$

$$APO_{ses} = A\% \times PO_{ses} \times TP$$

10) Calculate the BISPOs for the path:

$$BISPO_{es} = \frac{APO_{es}}{2}$$

$$BISPO_{ses} = \frac{APO_{ses}}{2}$$

11) For TPs < 7 days, calculate s1 and s2 values:

$$D_{es} + 2\sqrt{BISPO_{es}}$$

$$s1_{es} = BISPO_{es} - D_{es}$$

$$s2_{es} = BISPO_{es} + D_{es}$$

$$D_{ses} = 2\sqrt{BISPO_{ses}}$$

$$s1_{ses} = BISPO_{ses} - D_{ses}$$

$$s2_{ses} = BISPO_{ses} + D_{ses}$$

Round all s1 and s2 values to the nearest integer value.

12) Calculate Degraded Performance Limit thresholds for the path:

$$DPL_{es} = 0.75 \times APO_{es}\left[TP = 86\ 400\right]$$

$$DPL_{ses} = 0.75 \times APO_{ses}\left[TP = 86\ 400\right]$$

13) Read the Unacceptable Performance Limit thresholds from Annex D for the path bit rate. These are pragmatic values.

Note that if any PCE within a Path is changed, then the whole calculation process must be repeated, since the s1 and s2 values are non-linear.

10.1.4 Process for calculation of multiplex section performance limits

The following steps shall be followed to obtain multiplex section performance limits:

1) Identify the bit rate of the multiplex section.

2) Read the PO for the appropriate bit rate from Table 3 for both ES and SES:

$$PO_{es} = x\%$$

$$PO_{ses} = y\%$$

3) Identify the length, *d*, of the multiplex section. The length, *d*, is either the actual multiplex section length or can be estimated by the great circle length between its endpoints multiplied by the appropriate routing factor from Table 1.

4) Read the allocation, A%, (as a percentage of end-to-end PO) from Table 2B.

At this point, the BISPO, s1, s2 and UPL values can be read from the tables given in Annexes C and D. Alternatively, the following steps can be used to calculate those values:

5) Determine the required Test Period, (TP) where TP = 15 min., 2 hours, 24 hours, or 7 days.

6) Express TP in seconds, e.g. TP = 900 seconds for a 15-minute test.

7) Calculate the APOs (Allocated Performance Objectives) required from the information already obtained:

$$APO_{es} = A\% \times PO_{es} \times TP$$

$$APO_{ses} = A\% \times PO_{ses} \times TP$$

8) Calculate the BISPOs for the multiplex section:

$$BISPO_{es} = \frac{APO_{es}}{10}$$

$$BISPO_{ses} = \frac{APO_{ses}}{10}$$

9) For TPs < 7 days, calculate s1 and s2 values:

$$D_{es} = 2\sqrt{BISPO_{es}}$$

$$s1_{es} = BISPO_{es} - D_{es}$$

$$s2_{es} = BISPO_{es} + D_{es}$$

$$D_{ses} = 2\sqrt{BISPO_{ses}}$$

$$s1_{ses} = BISPO_{ses} - D_{ses}$$

$$s2_{ses} = BISPO_{ses} + D_{ses}$$

Round all s1 and s2 values to the nearest integer value.

10) Calculate Degraded Performance Limit thresholds for the multiplex section:

$$DPL_{es} = 0.5 \times APO_{es}\left[TP = 86\ 400\right]$$

$$DPL_{ses} = 0.5 \times APO_{ses}\left[TP = 86\ \ 400\right]$$

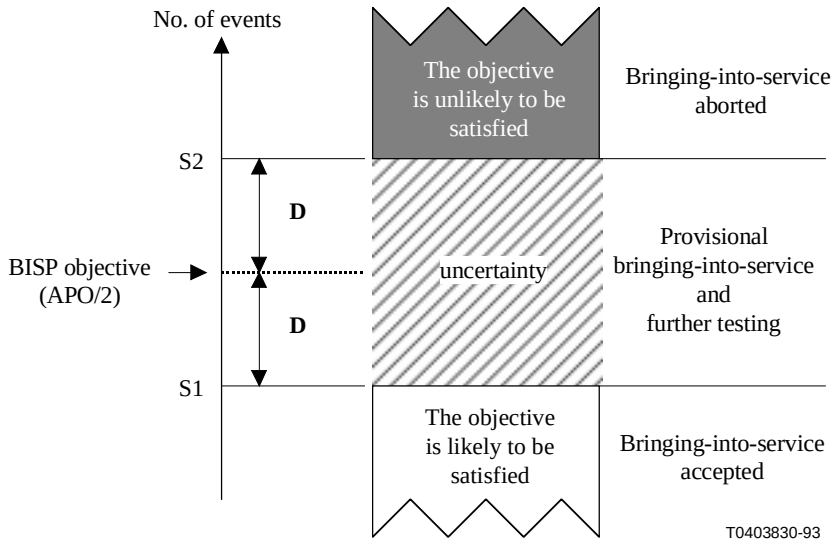
11) Read the Unacceptable Performance Limit thresholds from Annex D for the multiplex section bit rate. These are pragmatic values.

10.2 Performance limits and methodology for BIS

The BIS testing procedure, including how to deal with any period of unavailability during the test, is defined in 4.2/M.2110. This subclause defines the methodology of calculation of BIS performance limits for international paths. The derivation of the limits is a function of a given allocation and the measurement duration, and is based on a pragmatic rule. These limits, which depend on parameters and objectives from Recommendations G.826 and G.EPMRS, are derived from the values shown in Tables 2 and 3.

The difference between the APO and the BIS limit is called the ageing margin. This margin should be as large as possible to minimize maintenance interventions.

Two limits, S1 and S2, are provided for use in BIS testing, as shown in Figure 4.



NOTE – For derivation of D, see 10.1.3.

Figure 4/M.2101.1 – Bringing-into-service limits and conditions

If performance is better than the first limit S1, the entity can be brought into service with some confidence. If performance is between the two limits, further testing is necessary and the entity can only be provisionally accepted. Corrective action is required if performance is worse than the second limit S2.

The ageing margin for paths is 0.5 times the APO and the ageing margin for multiplex sections is 0.1 times the APO.

Continuous in-service monitoring is required to provide sufficient confidence in the long-term performance.

10.2.1 BIS limit values

By application of the methodology described above, the performance limits for BIS are given in Annex C tables (C.1 up to C.6), where values of S1 and S2 are calculated according to the allocation and the testing duration. Note that the S1 and S2 limits are not used for seven-day tests. BIS tests described in Recommendation M.2110 are:

– 24-hour limits – Basic test as described in Recommendation M.2110;

– 2-hour limits – Some cases as described in Recommendation M.2110;

– 7-day limits – In some cases, described in Recommendation M.2110, a supplementary test over seven days is necessary and performance must satisfy the BISPO on seven days, for each parameter (ES and SES).

Tables C.i (i = 1, 2, 3, 4, 5, 6) in Annex C give the values of BISPO, S1 and S2 limits.

10.3 Performance limits for maintenance

Once entities have been placed into service, the supervision of the network requires additional limits, as described in Recommendation M.20. The supervision process involves analyzing anomalies and defects detected by maintenance entities to determine the performance level. The maintenance procedures are defined in Recommendation M.2120.

10.3.1 Performance levels and limits

According to Recommendation M.20, an entity can be in a limited number of pre-defined conditions depending on its performance. These conditions are called performance levels, and are the Unacceptable Performance Level, the Degraded Performance Level and the Acceptable Performance Level. The boundaries between the performance levels are called performance limits. The performance limits are a function of the APO as follows:

– UP Limit $\geq 10 \times$ APO;

– DP Limit $= 0.75 \times$ APO (path);

– DP Limit $= 0.50 \times$ APO (multiplex section).

In the case of testing performance after repair, a special limit, Performance After Repair, is used (see Recommendations M.35 and M.2110) where:

– Performance After Repair $= 0.125 \times$ APO (multiplex section);

– Performance After Repair $= 0.50 \times$ APO (path).

This limit is not a boundary between performance levels. The BIS limit is described earlier in the Recommendation and is also not a boundary between performance levels. These principles are illustrated in Table 4.

Table 4/M.2101.1 – Performance limits (ES and SES) relative to APO from a long-term perspective (> 1 month)

Multiplex sections			Paths		
Limit (Relative to APO)		**Performance level**	**Limit (Relative to APO)**		**Performance level**
Bringing-into-service	0.10	ACCEPTABLE	Bringing-into-service	0.50	ACCEPTABLE
Performance after repair	0.125		Performance after repair	0.50	
Degraded	≥ 0.50	DEGRADED	Degraded	≥ 0.75	DEGRADED
Reference performance objective	1.00		Reference performance objective	1.00	
Unacceptable	≥ 10	UNACCEPTABLE	Unacceptable	≥ 10	UNACCEPTABLE

10.3.2 Thresholds

When a limit is given a specific value in terms of ES and/or SES, the ES and/or SES value is called a threshold. Each threshold will have an associated measurement duration.

10.3.2.1 Use of thresholds

The general strategy for the use of performance monitoring information and thresholds is described in Recommendations M.20 and M.34. These thresholds and monitoring information will be reported to operations systems via the TMN for both real time and longer term analysis. When thresholds of unacceptable or degraded performance levels are reached, maintenance action should be initiated independently of the performance measurement. Other thresholds may be used for maintenance and longer term quality analysis. The operations systems will use real time processing to assign maintenance priorities to these threshold crossings and information, using the performance supervision process described in Recommendation M.20.

10.3.2.2 Types of thresholds

There are two types of thresholds according to the monitoring duration T1 or T2.

Thresholds associated with a T1 evaluation period

The monitoring duration T1 is fixed to a 15-minute value and ES and SES are counted over this period. The T1 period is to assist in detection of transition to or from the unacceptable performance level.

A threshold report occurs when an ES or SES threshold is exceeded. The reset threshold report, which is an optional feature, occurs when the number of ES and SES is lower than or equal to the reset threshold. Those principles are explained in 2.3/M.2120.

Thresholds associated with a T2 evaluation period

The monitoring duration T2 is fixed to a 24-hour value. The T2 period is to assist in detection of transition to the degraded performance level.

A threshold report occurs when an ES or SES threshold is exceeded over the period of time T2 as explained in Recommendation M.2120.

10.3.2.3 Threshold values

Thresholds should be programmable (for both ES and SES) to suit specific operating requirements. In particular, the need for iterative adjustment (with operational experience) of the threshold is seen as a likely requirement.

The default unacceptable performance thresholds for the 15-minute evaluation periods are given in Table D.1 for VC-1, 2, 3, 4 and STM-1, 4, 16, 64.

Thresholds for the 24-hour evaluation period are the responsibility of each network operator. $0.75 \times$ APO values are suggested for paths. $0.5 \times$ APO values are suggested for multiplex sections.

10.4 Long-term quality monitoring/measurement

Performance monitoring history should be kept for at least one year (suggested) by the management system.

11 Effects of timing impairments on error performance

Jitter and wander are timing impairments related to the fluctuations in the timing signal. Limits for jitter and wander are defined in Recommendation G.825. Those limits are fixed in such a way that a given level of jitter could be applied to the input of a network equipment without producing errors or excessive jitter at its output.

Therefore, for maintenance purposes, the error performance requirements are sufficient to deal with those timing impairments.

12 Availability and unavailability

12.1 Criteria for entry/exit for the Unavailable State

A period of unavailable time begins at the onset of ten consecutive SES events. These ten seconds are considered to be part of unavailable time. A new period of available time begins at the onset of ten consecutive non-SES events. These ten seconds are considered to be part of available time. Note that the availability criterion is defined for a single direction only. This definition is aligned with the

corresponding definition in Annex A.1/G.826. The availability criterion for a bi-directional path, defined in Annex A.2/G.826, is used in the performance data collection and evaluation process for long term network performance characterization. This Recommendation deals with the performance data collection and evaluation process only for BIS and maintenance purposes; this Recommendation therefore does not use the bi-directional definition.

To determine the entry/exit from unavailability, the collection of SES is necessary. See G.784 for implementation of SES collection.

12.2 Inhibiting performance monitoring during unavailable time

During unavailable time, the count of performance events is inhibited. When only one direction of a bi-directional path is unavailable, the count of performance events is inhibited for this direction and continues for the other direction. Figure 5 illustrates the rules for determining the unavailable second parameter and for inhibiting other parameter counts. Reading down and left to right, the first row represents the error condition and shows momentary and persistent conditions. It indicates if an error condition exists (Y) or not (N). Error conditions include anomalies and defects as shown. Proceeding in a similar manner, the latter three rows show the procedures for calculating path unavailable seconds, real-time and adjusted real-time parameter counts.

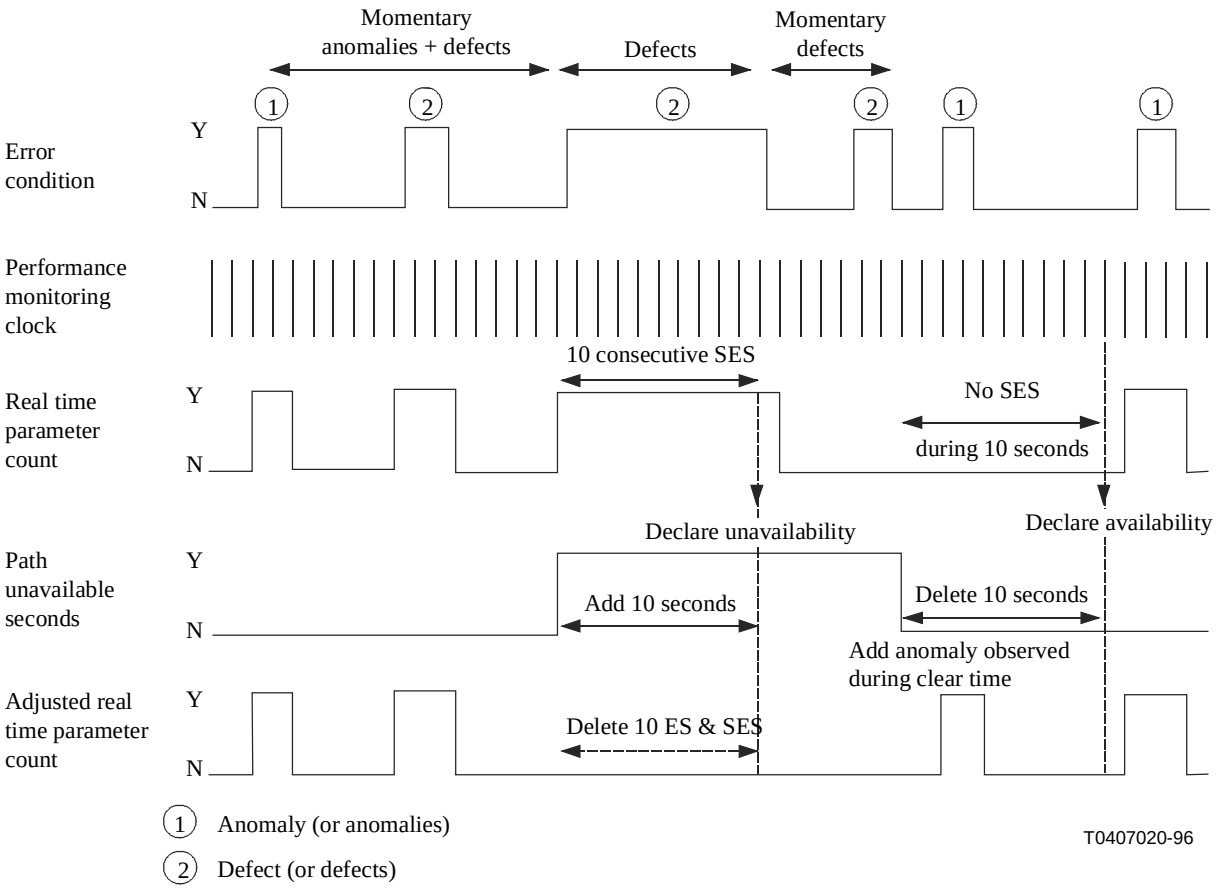


Figure 5/M.2101.1 – Illustration of performance monitoring inhibiting during unavailable time

This figure shows the correction to the unavailable counter, and the rules for deleting and adding increments in time in the unavailable second counter. It also shows the count of anomalies during the clearing time interval.

Note that the signal condition transition, or declaration instant of a defect or anomaly condition is independent of the performance monitoring clock one-second boundaries.

12.3 Unavailability limits

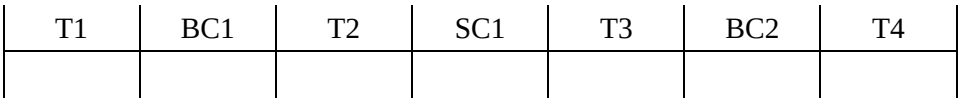
For the time being, unavailability limits are left for negotiation. This subject is under consideration.

ANNEX A

Example applications of path allocation (A%) from Table 2A

This annex provides an example showing the application of path allocation (A%) as described in clause 7.

Example: An SDH path



T	Terminating or transit IPCE		
BC	Border crossing ICPCE		
SC	Submarine cable ICPCE		
T1, T4	IPCE (Terminating)	1000 km – 2500 km	$2 \times 4.0\% = 8\%$
T2	IPCE (Transit)	500 km – 1000 km	$1 \times 3.0\% = 3.0\%$
T3	IPCE (Transit)	< 500 km	$1 \times 2.0\% = 2.0\%$
SC1	ICPCE (Optical undersea cable)		$1 \times 2.5\% = 2.5\%$
BC1, BC2	ICPCE (Terrestrial)		$2 \times 0.3\% = 0.6\%$
		Total SDH path allocation	= 16.1%

ANNEX B

Table B.1/M.2101.1 – In-service ES and SES parameter evaluation criteria for the LO path layer

		ES/SES parameter evaluation criteria (Anomalies and defects in 1 second)			
Virtual container type	**Path overhead available to derive anomaly and defect information**	**Anomalies and defects in 1 second**	**Interpretation for Receive direction**	**Interpretation for Send direction**	**Remarks**
VC-11, VC-12, VC-2, and VC-2-5C	H4 V1, V2 V1, V2 J2 V5 V5 V5 V5 V5	≥ 1 TU-LOM ≥ 1 TU-AIS ≥ 1 TU-LOP ≥ 1 LP-TIM ≥ 1 LP-UNEQ ≥ 1 BIP-2 error ≥ 600 BIP-2 errors ≥ 1 LP-REI ≥ 1 LP-RDI	ES + SES ES + SES ES + SES ES + SES ES + SES ES ES + SES	 ES ES + SES	LP-TIM and LP-UNEQ are under study
VC-3	H1, H2, H3 H1, H2, H3 J1 C2 B3 B3 G1 G1	≥ 1 TU-AIS ≥ 1 TU-LOP ≥ 1 LP-TIM ≥ 1 LP-UNEQ ≥ 1 BIP-8 error ≥ 2400 BIP-8 errors ≥ 1 LP-REI ≥ 1 LP-RDI	ES + SES ES + SES ES + SES ES + SES ES ES + SES	 ES ES + SES	

Table B.2/M.2101.1 – In service ES and SES parameter evaluation criteria for the HO path layer

		ES/SES parameter evaluation criteria (Anomalies and defects in 1 second)			
Virtual container type	**Path overhead available to derive anomaly and defect information**	**Anomalies and defects in 1 second**	**Interpretation for Receive direction**	**Interpretation for Send direction**	**Remarks**
VC-3, VC-4 and VC-4-4C	H1, H2, H3 H1, H2, H3 J1 C2 B3 B3 G1 G1	≥ 1 AU-AIS ≥ 1 AU-LOP ≥ 1 HP-TIM ≥ 1 HP-UNEQ ≥ 1 BIP-8 error ≥ 2400 BIP-8 errors ≥ 1 HP-REI ≥ 1 HP-RDI	ES + SES ES + SES ES + SES ES + SES ES ES + SES	 ES ES + SES	HP-TIM and HP-UNEQ are under study

Table B.3/M.2101.1 – In service ES and SES parameter evaluation criteria for the section layer

		ES/SES parameter measurement criteria (Anomalies and defects in 1 second)			
Section type and STM level	**Section overhead available to derive anomaly and defect information**	**Anomalies and defects in 1 second**	**Interpretation for Receive direction**	**Interpretation for Send direction**	**Remarks**
MS-STM-1, MS-STM-4 and MS- STM-16	B2 B2 K1, K2 M1 K2	≥ 1 BIP-1 error ≥ b BIP-1 errors ≥ 1 MS-AIS ≥ 1 MS-REI ≥ 1 MS-RDI	ES ES + SES ES + SES	 ES ES + SES	b is under study; the value will depend on the hierarchical level.

ANNEX C

Table C.1/M.2101.1 – Allocated performance objectives for VC-1

	VC-1 ES Objectives (PO=2%)									VC-1 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-1 Path Alloc.	**APO**	**BISO**	**S1**	**S2**	**APO**	**BISO**	**S1**	**S2**	**BISO**	**APO**	**BISO**	**S1**	**S2**	**APO**	**BISO**	**S1**	**S2**	**BISO**
0.5%	1	0	0	2	9	4	0	8	30	0	0	0	0	0	0	0	1	2
1.0%	1	1	0	2	17	9	3	15	60	0	0	0	0	1	0	0	2	3
1.5%	2	1	0	3	26	13	6	20	91	0	0	0	1	1	1	0	2	5
2.0%	3	1	0	4	35	17	9	26	121	0	0	0	1	2	1	0	3	6
2.5%	4	2	0	4	43	22	12	31	151	0	0	0	1	2	1	0	3	8
3.0%	4	2	0	5	52	26	16	36	181	0	0	0	1	3	1	0	4	9
3.5%	5	3	0	6	60	30	19	41	212	0	0	0	1	3	2	0	4	11
4.0%	6	3	0	6	69	35	23	46	242	0	0	0	1	3	2	0	4	12
4.5%	6	3	0	7	78	39	26	51	272	0	0	0	1	4	2	0	5	14
5.0%	7	4	0	7	86	43	30	56	302	0	0	0	1	4	2	0	5	15
5.5%	8	4	0	8	95	48	34	61	333	0	0	0	1	5	2	0	5	17
6.0%	9	4	0	8	104	52	37	66	363	0	0	0	1	5	3	0	6	18
6.5%	9	5	0	9	112	56	41	71	393	0	0	0	1	6	3	0	6	20
7.0%	10	5	1	10	121	60	45	76	423	1	0	0	1	6	3	0	7	21
7.5%	11	5	1	10	130	65	49	81	454	1	0	0	1	6	3	0	7	23
8.0%	12	6	1	11	138	69	52	86	484	1	0	0	1	7	3	0	7	24
8.5%	12	6	1	11	147	73	56	91	514	1	0	0	1	7	4	0	8	26
9.0%	13	6	1	12	156	78	60	95	544	1	0	0	1	8	4	0	8	27
9.5%	14	7	2	12	164	82	64	100	575	1	0	0	2	8	4	0	8	29
10.0%	14	7	2	13	173	86	68	105	605	1	0	0	2	9	4	0	8	30
10.5%	15	8	2	13	181	91	72	110	635	1	0	0	2	9	5	0	9	32
11.0%	16	8	2	14	190	95	76	115	665	1	0	0	2	10	5	0	9	33
11.5%	17	8	3	14	199	99	79	119	696	1	0	0	2	10	5	1	9	35
12.0%	17	9	3	15	207	104	83	124	726	1	0	0	2	10	5	1	10	36
12.5%	18	9	3	15	216	108	87	129	756	1	0	0	2	11	5	1	10	38
13.0%	19	9	3	15	225	112	91	134	786	1	0	0	2	11	6	1	10	39

Table C.1/M.2101.1 – Allocated performance objectives for VC-1 *(continued)*

	VC-1 ES Objectives (PO=2%)									VC-1 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-1 Path Alloc.	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO
13.5%	19	10	3	16	233	117	95	138	816	1	0	0	2	12	6	1	11	41
14.0%	20	10	4	16	242	121	99	143	847	1	1	0	2	12	6	1	11	42
14.5%	21	10	4	17	251	125	103	148	877	1	1	0	2	13	6	1	11	44
15.0%	22	11	4	17	259	130	107	152	907	1	1	0	2	13	6	1	12	45
15.5%	22	11	4	18	268	134	111	157	937	1	1	0	2	13	7	2	12	47
16.0%	23	12	5	18	276	138	115	162	968	1	1	0	2	14	7	2	12	48
16.5%	24	12	5	19	285	143	119	166	998	1	1	0	2	14	7	2	12	50
17.0%	24	12	5	19	294	147	123	171	1028	1	1	0	2	15	7	2	13	51
17.5%	25	13	6	20	302	151	127	176	1058	1	1	0	2	15	8	2	13	53
18.0%	26	13	6	20	311	156	131	180	1089	1	1	0	2	16	8	2	13	54
18.5%	27	13	6	21	320	160	135	185	1119	1	1	0	2	16	8	2	14	56
19.0%	27	14	6	21	328	164	139	190	1149	1	1	0	2	16	8	2	14	57
19.5%	28	14	7	22	337	168	143	194	1179	1	1	0	2	17	8	3	14	59
20.0%	29	14	7	22	346	173	147	199	1210	1	1	0	2	17	9	3	15	60
20.5%	30	15	7	22	354	177	151	204	1240	1	1	0	2	18	9	3	15	62
21.0%	30	15	7	23	363	181	155	208	1270	2	1	0	2	18	9	3	15	64
21.5%	31	15	8	23	372	186	159	213	1300	2	1	0	3	19	9	3	15	65
22.0%	32	16	8	24	380	190	163	218	1331	2	1	0	3	19	10	3	16	67
22.5%	32	16	8	24	389	194	167	222	1361	2	1	0	3	19	10	3	16	68
23.0%	33	17	8	25	397	199	171	227	1391	2	1	0	3	20	10	4	16	70
23.5%	34	17	9	25	406	203	175	232	1421	2	1	0	3	20	10	4	17	71
24.0%	35	17	9	26	415	207	179	236	1452	2	1	0	3	21	10	4	17	73
24.5%	35	18	9	26	423	212	183	241	1482	2	1	0	3	21	11	4	17	74
25.0%	36	18	10	26	432	216	187	245	1512	2	1	0	3	22	11	4	17	76
25.5%	37	18	10	27	441	220	191	250	1542	2	1	0	3	22	11	4	18	77
26.0%	37	19	10	27	449	225	195	255	1572	2	1	0	3	22	11	5	18	79
26.5%	38	19	10	28	458	229	199	259	1603	2	1	0	3	23	11	5	18	80
27.0%	39	19	11	28	467	233	203	264	1633	2	1	0	3	23	12	5	18	82
27.5%	40	20	11	29	475	238	207	268	1663	2	1	0	3	24	12	5	19	83
28.0%	40	20	11	29	484	242	211	273	1693	2	1	0	3	24	12	5	19	85
28.5%	41	21	11	30	492	246	215	278	1724	2	1	0	3	25	12	5	19	86
29.0%	42	21	12	30	501	251	219	282	1754	2	1	0	3	25	13	5	20	88
29.5%	42	21	12	30	510	255	223	287	1784	2	1	0	3	25	13	6	20	89
30.0%	43	22	12	31	518	259	227	291	1814	2	1	0	3	26	13	6	20	91
30.5%	44	22	13	31	527	264	231	296	1845	2	1	0	3	26	13	6	20	92
31.0%	45	22	13	32	536	268	235	301	1875	2	1	0	3	27	13	6	21	94
31.5%	45	23	13	32	544	272	239	305	1905	2	1	0	3	27	14	6	21	95
32.0%	46	23	13	33	553	276	243	310	1935	2	1	0	3	28	14	6	21	97
32.5%	47	23	14	33	562	281	247	314	1966	2	1	0	3	28	14	7	22	98
33.0%	48	24	14	34	570	285	251	319	1996	2	1	0	3	29	14	7	22	100
33.5%	48	24	14	34	579	289	255	323	2026	2	1	0	3	29	14	7	22	101
34.0%	49	24	15	34	588	294	259	328	2056	2	1	0	3	29	15	7	22	103

Table C.1/M.2101.1 – Allocated performance objectives for VC-1 *(continued)*

	VC-1 ES Objectives (PO=2%)									VC-1 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-1 Path Alloc.	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO
34.5%	50	25	15	35	596	298	264	333	2087	2	1	0	3	30	15	7	23	104
35.0%	50	25	15	35	605	302	268	337	2117	3	1	0	4	30	15	7	23	106
35.5%	51	26	15	36	613	307	272	342	2147	3	1	0	4	31	15	8	23	107
36.0%	52	26	16	36	622	311	276	346	2177	3	1	0	4	31	16	8	23	109
36.5%	53	26	16	37	631	315	280	351	2208	3	1	0	4	32	16	8	24	110
37.0%	53	27	16	37	639	320	284	355	2238	3	1	0	4	32	16	8	24	112
37.5%	54	27	17	37	648	324	288	360	2268	3	1	0	4	32	16	8	24	113
38.0%	55	27	17	38	657	328	292	365	2298	3	1	0	4	33	16	8	25	115
38.5%	55	28	17	38	665	333	296	369	2328	3	1	0	4	33	17	8	25	116
39.0%	56	28	17	39	674	337	300	374	2359	3	1	0	4	34	17	9	25	118
39.5%	57	28	18	39	683	341	304	378	2389	3	1	0	4	34	17	9	25	119
40.0%	58	29	18	40	691	346	308	383	2419	3	1	0	4	35	17	9	26	121
40.5%	58	29	18	40	700	350	313	387	2449	3	1	0	4	35	17	9	26	122
41.0%	59	30	19	40	708	354	317	392	2480	3	1	0	4	35	18	9	26	124
41.5%	60	30	19	41	717	359	321	396	2510	3	1	0	4	36	18	9	26	125
42.0%	60	30	19	41	726	363	325	401	2540	3	2	0	4	36	18	10	27	127
42.5%	61	31	20	42	734	367	329	406	2570	3	2	0	4	37	18	10	27	129
43.0%	62	31	20	42	743	372	333	410	2601	3	2	0	4	37	19	10	27	130
43.5%	63	31	20	43	752	376	337	415	2631	3	2	0	4	38	19	10	27	132
44.0%	63	32	20	43	760	380	341	419	2661	3	2	0	4	38	19	10	28	133
44.5%	64	32	21	43	769	384	345	424	2691	3	2	0	4	38	19	10	28	135
45.0%	65	32	21	44	778	389	349	428	2722	3	2	0	4	39	19	11	28	136
45.5%	66	33	21	44	786	393	353	433	2752	3	2	0	4	39	20	11	29	138
46.0%	66	33	22	45	795	397	358	437	2782	3	2	0	4	40	20	11	29	139
46.5%	67	33	22	45	804	402	362	442	2812	3	2	0	4	40	20	11	29	141
47.0%	68	34	22	45	812	406	366	446	2843	3	2	0	4	41	20	11	29	142
47.5%	68	34	23	46	821	410	370	451	2873	3	2	0	4	41	21	11	30	144
48.0%	69	35	23	46	829	415	374	455	2903	3	2	0	4	41	21	12	30	145
48.5%	70	35	23	47	838	419	378	460	2933	3	2	0	4	42	21	12	30	147
49.0%	71	35	23	47	847	423	382	465	2964	4	2	0	4	42	21	12	30	148
49.5%	71	36	24	48	855	428	386	469	2994	4	2	0	4	43	21	12	31	150
50.0%	72	36	24	48	864	432	390	474	3024	4	2	0	4	43	22	12	31	151
50.5%	73	36	24	48	873	436	395	478	3054	4	2	0	5	44	22	12	31	153
51.0%	73	37	25	49	881	441	399	483	3084	4	2	0	5	44	22	13	31	154
51.5%	74	37	25	49	890	445	403	487	3115	4	2	0	5	44	22	13	32	156
52.0%	75	37	25	50	899	449	407	492	3145	4	2	0	5	45	22	13	32	157
52.5%	76	38	26	50	907	454	411	496	3175	4	2	0	5	45	23	13	32	159
53.0%	76	38	26	51	916	458	415	501	3205	4	2	0	5	46	23	13	32	160
53.5%	77	39	26	51	924	462	419	505	3236	4	2	0	5	46	23	13	33	162
54.0%	78	39	26	51	933	467	423	510	3266	4	2	0	5	47	23	14	33	163
54.5%	78	39	27	52	942	471	427	514	3296	4	2	0	5	47	24	14	33	165
55.0%	79	40	27	52	950	475	432	519	3326	4	2	0	5	48	24	14	34	166

Table C.1/M.2101.1 – Allocated performance objectives for VC-1 *(concluded)*

	VC-1 ES Objectives (PO=2%)									VC-1 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-1 Path Alloc.	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO
55.5%	80	40	27	53	959	480	436	523	3357	4	2	0	5	48	24	14	34	168
56.0%	81	40	28	53	968	484	440	528	3387	4	2	0	5	48	24	14	34	169
56.5%	81	41	28	53	976	488	444	532	3417	4	2	0	5	49	24	15	34	171
57.0%	82	41	28	54	985	492	448	537	3447	4	2	0	5	49	25	15	35	172
57.5%	83	41	29	54	994	497	452	541	3478	4	2	0	5	50	25	15	35	174
58.0%	84	42	29	55	1002	501	456	546	3508	4	2	0	5	50	25	15	35	175
58.5%	84	42	29	55	1011	505	460	550	3538	4	2	0	5	51	25	15	35	177
59.0%	85	42	29	56	1020	510	465	555	3568	4	2	0	5	51	25	15	36	178
59.5%	86	43	30	56	1028	514	469	559	3599	4	2	0	5	51	26	16	36	180
60.0%	86	43	30	56	1037	518	473	564	3629	4	2	0	5	52	26	16	36	181
60.5%	87	44	30	57	1045	523	477	568	3659	4	2	0	5	52	26	16	36	183
61.0%	88	44	31	57	1054	527	481	573	3689	4	2	0	5	53	26	16	37	184
61.5%	89	44	31	58	1063	531	485	577	3720	4	2	0	5	53	27	16	37	186
62.0%	89	45	31	58	1071	536	489	582	3750	4	2	0	5	54	27	16	37	187
62.5%	90	45	32	58	1080	540	494	586	3780	5	2	0	5	54	27	17	37	189
63.0%	91	45	32	59	1089	544	498	591	3810	5	2	0	5	54	27	17	38	191

Table C.2/M.2101.1 – Allocated performance objectives for VC-2

	VC-2 ES Objectives (PO=2.5%)									VC-2 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-2 Path Alloc.	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO
0.5%	1	0	0	2	11	5	1	10	38	0	0	0	0	0	0	0	1	2
1.0%	2	1	0	3	22	11	4	17	76	0	0	0	0	1	0	0	2	3
1.5%	3	1	0	4	32	16	8	24	113	0	0	0	1	1	1	0	2	5
2.0%	4	2	0	4	43	22	12	31	151	0	0	0	1	2	1	0	3	6
2.5%	5	2	0	5	54	27	17	37	189	0	0	0	1	2	1	0	3	8
3.0%	5	3	0	6	65	32	21	44	227	0	0	0	1	3	1	0	4	9
3.5%	6	3	0	7	76	38	26	50	265	0	0	0	1	3	2	0	4	11
4.0%	7	4	0	7	86	43	30	56	302	0	0	0	1	3	2	0	4	12
4.5%	8	4	0	8	97	49	35	63	340	0	0	0	1	4	2	0	5	14
5.0%	9	5	0	9	108	54	39	69	378	0	0	0	1	4	2	0	5	15
5.5%	10	5	1	9	119	59	44	75	416	0	0	0	1	5	2	0	5	17
6.0%	11	5	1	10	130	65	49	81	454	0	0	0	1	5	3	0	6	18
6.5%	12	6	1	11	140	70	53	87	491	0	0	0	1	6	3	0	6	20
7.0%	13	6	1	11	151	76	58	93	529	1	0	0	1	6	3	0	7	21
7.5%	14	7	2	12	162	81	63	99	567	1	0	0	1	6	3	0	7	23
8.0%	14	7	2	13	173	86	68	105	605	1	0	0	1	7	3	0	7	24
8.5%	15	8	2	13	184	92	73	111	643	1	0	0	1	7	4	0	8	26
9.0%	16	8	2	14	194	97	77	117	680	1	0	0	1	8	4	0	8	27

Table C.2/M.2101.1 – Allocated performance objectives for VC-2 *(continued)*

	VC-2 ES Objectives (PO=2.5%)									VC-2 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-2 Path Alloc.	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO
9.5%	17	9	3	14	205	103	82	123	718	1	0	0	2	8	4	0	8	29
10.0%	18	9	3	15	216	108	87	129	756	1	0	0	2	9	4	0	8	30
10.5%	19	9	3	16	227	113	92	135	794	1	0	0	2	9	5	0	9	32
11.0%	20	10	4	16	238	119	97	141	832	1	0	0	2	10	5	0	9	33
11.5%	21	10	4	17	248	124	102	146	869	1	0	0	2	10	5	1	9	35
12.0%	22	11	4	17	259	130	107	152	907	1	0	0	2	10	5	1	10	36
12.5%	23	11	5	18	270	135	112	158	945	1	0	0	2	11	5	1	10	38
13.0%	23	12	5	19	281	140	117	164	983	1	0	0	2	11	6	1	10	39
13.5%	24	12	5	19	292	146	122	170	1021	1	0	0	2	12	6	1	11	41
14.0%	25	13	6	20	302	151	127	176	1058	1	1	0	2	12	6	1	11	42
14.5%	26	13	6	20	313	157	132	182	1096	1	1	0	2	13	6	1	11	44
15.0%	27	14	6	21	324	162	137	187	1134	1	1	0	2	13	6	1	12	45
15.5%	28	14	6	21	335	167	142	193	1172	1	1	0	2	13	7	2	12	47
16.0%	29	14	7	22	346	173	147	199	1210	1	1	0	2	14	7	2	12	48
16.5%	30	15	7	23	356	178	152	205	1247	1	1	0	2	14	7	2	12	50
17.0%	31	15	7	23	367	184	157	211	1285	1	1	0	2	15	7	2	13	51
17.5%	32	16	8	24	378	189	162	216	1323	1	1	0	2	15	8	2	13	53
18.0%	32	16	8	24	389	194	167	222	1361	1	1	0	2	16	8	2	13	54
18.5%	33	17	8	25	400	200	172	228	1399	1	1	0	2	16	8	2	14	56
19.0%	34	17	9	25	410	205	177	234	1436	1	1	0	2	16	8	2	14	57
19.5%	35	18	9	26	421	211	182	240	1474	1	1	0	2	17	8	3	14	59
20.0%	36	18	10	26	432	216	187	245	1512	1	1	0	2	17	9	3	15	60
20.5%	37	18	10	27	443	221	192	251	1550	1	1	0	2	18	9	3	15	62
21.0%	38	19	10	28	454	227	197	257	1588	2	1	0	2	18	9	3	15	64
21.5%	39	19	11	28	464	232	202	263	1625	2	1	0	3	19	9	3	15	65
22.0%	40	20	11	29	475	238	207	268	1663	2	1	0	3	19	10	3	16	67
22.5%	41	20	11	29	486	243	212	274	1701	2	1	0	3	19	10	3	16	68
23.0%	41	21	12	30	497	248	217	280	1739	2	1	0	3	20	10	4	16	70
23.5%	42	21	12	30	508	254	222	286	1777	2	1	0	3	20	10	4	17	71
24.0%	43	22	12	31	518	259	227	291	1814	2	1	0	3	21	10	4	17	73
24.5%	44	22	13	31	529	265	232	297	1852	2	1	0	3	21	11	4	17	74
25.0%	45	23	13	32	540	270	237	303	1890	2	1	0	3	22	11	4	17	76
25.5%	46	23	13	33	551	275	242	309	1928	2	1	0	3	22	11	4	18	77
26.0%	47	23	14	33	562	281	247	314	1966	2	1	0	3	22	11	5	18	79
26.5%	48	24	14	34	572	286	252	320	2003	2	1	0	3	23	11	5	18	80
27.0%	49	24	14	34	583	292	257	326	2041	2	1	0	3	23	12	5	18	82
27.5%	50	25	15	35	594	297	263	331	2079	2	1	0	3	24	12	5	19	83
28.0%	50	25	15	35	605	302	268	337	2117	2	1	0	3	24	12	5	19	85
28.5%	51	26	16	36	616	308	273	343	2155	2	1	0	3	25	12	5	19	86
29.0%	52	26	16	36	626	313	278	349	2192	2	1	0	3	25	13	5	20	88
29.5%	53	27	16	37	637	319	283	354	2230	2	1	0	3	25	13	6	20	89
30.0%	54	27	17	37	648	324	288	360	2268	2	1	0	3	26	13	6	20	91

Table C.2/M.2101.1 – Allocated performance objectives for VC-2 *(continued)*

	VC-2 ES Objectives (PO=2.5%)									VC-2 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-2 Path Alloc.	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO
30.5%	55	27	17	38	659	329	293	366	2306	2	1	0	3	26	13	6	20	92
31.0%	56	28	17	38	670	335	298	371	2344	2	1	0	3	27	13	6	21	94
31.5%	57	28	18	39	680	340	303	377	2381	2	1	0	3	27	14	6	21	95
32.0%	58	29	18	40	691	346	308	383	2419	2	1	0	3	28	14	6	21	97
32.5%	59	29	18	40	702	351	314	388	2457	2	1	0	3	28	14	7	22	98
33.0%	59	30	19	41	713	356	319	394	2495	2	1	0	3	29	14	7	22	100
33.5%	60	30	19	41	724	362	324	400	2533	2	1	0	3	29	14	7	22	101
34.0%	61	31	20	42	734	367	329	406	2570	2	1	0	3	29	15	7	22	103
34.5%	62	31	20	42	745	373	334	411	2608	2	1	0	3	30	15	7	23	104
35.0%	63	32	20	43	756	378	339	417	2646	3	1	0	4	30	15	7	23	106
35.5%	64	32	21	43	767	383	344	423	2684	3	1	0	4	31	15	8	23	107
36.0%	65	32	21	44	778	389	349	428	2722	3	1	0	4	31	16	8	23	109
36.5%	66	33	21	44	788	394	354	434	2759	3	1	0	4	32	16	8	24	110
37.0%	67	33	22	45	799	400	360	440	2797	3	1	0	4	32	16	8	24	112
37.5%	68	34	22	45	810	405	365	445	2835	3	1	0	4	32	16	8	24	113
38.0%	68	34	23	46	821	410	370	451	2873	3	1	0	4	33	16	8	25	115
38.5%	69	35	23	46	832	416	375	457	2911	3	1	0	4	33	17	8	25	116
39.0%	70	35	23	47	842	421	380	462	2948	3	1	0	4	34	17	9	25	118
39.5%	71	36	24	47	853	427	385	468	2986	3	1	0	4	34	17	9	25	119
40.0%	72	36	24	48	864	432	390	474	3024	3	1	0	4	35	17	9	26	121
40.5%	73	36	24	49	875	437	396	479	3062	3	1	0	4	35	17	9	26	122
41.0%	74	37	25	49	886	443	401	485	3100	3	1	0	4	35	18	9	26	124
41.5%	75	37	25	50	896	448	406	491	3137	3	1	0	4	36	18	9	26	125
42.0%	76	38	26	50	907	454	411	496	3175	3	2	0	4	36	18	10	27	127
42.5%	77	38	26	51	918	459	416	502	3213	3	2	0	4	37	18	10	27	129
43.0%	77	39	26	51	929	464	421	507	3251	3	2	0	4	37	19	10	27	130
43.5%	78	39	27	52	940	470	426	513	3289	3	2	0	4	38	19	10	27	132
44.0%	79	40	27	52	950	475	432	519	3326	3	2	0	4	38	19	10	28	133
44.5%	80	40	27	53	961	481	437	524	3364	3	2	0	4	38	19	10	28	135
45.0%	81	41	28	53	972	486	442	530	3402	3	2	0	4	39	19	11	28	136
45.5%	82	41	28	54	983	491	447	536	3440	3	2	0	4	39	20	11	29	138
46.0%	83	41	29	54	994	497	452	541	3478	3	2	0	4	40	20	11	29	139
46.5%	84	42	29	55	1004	502	457	547	3515	3	2	0	4	40	20	11	29	141
47.0%	85	42	29	55	1015	508	463	553	3553	3	2	0	4	41	20	11	29	142
47.5%	86	43	30	56	1026	513	468	558	3591	3	2	0	4	41	21	11	30	144
48.0%	86	43	30	56	1037	518	473	564	3629	3	2	0	4	41	21	12	30	145
48.5%	87	44	30	57	1048	524	478	570	3667	3	2	0	4	42	21	12	30	147
49.0%	88	44	31	57	1058	529	483	575	3704	4	2	0	4	42	21	12	30	148
49.5%	89	45	31	58	1069	535	488	581	3742	4	2	0	4	43	21	12	31	150
50.0%	90	45	32	58	1080	540	494	586	3780	4	2	0	4	43	22	12	31	151
50.5%	91	45	32	59	1091	545	499	592	3818	4	2	0	5	44	22	12	31	153
51.0%	92	46	32	59	1102	551	504	598	3856	4	2	0	5	44	22	13	31	154

Table C.2/M.2101.1 – Allocated performance objectives for VC-2 *(concluded)*

	VC-2 ES Objectives (PO=2.5%)									VC-2 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-2 Path Alloc.	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO
51.5%	93	46	33	60	1112	556	509	603	3893	4	2	0	5	44	22	13	32	156
52.0%	94	47	33	60	1123	562	514	609	3931	4	2	0	5	45	22	13	32	157
52.5%	95	47	34	61	1134	567	519	615	3969	4	2	0	5	45	23	13	32	159
53.0%	95	48	34	62	1145	572	525	620	4007	4	2	0	5	46	23	13	32	160
53.5%	96	48	34	62	1156	578	530	626	4045	4	2	0	5	46	23	13	33	162
54.0%	97	49	35	63	1166	583	535	631	4082	4	2	0	5	47	23	14	33	163
54.5%	98	49	35	63	1177	589	540	637	4120	4	2	0	5	47	24	14	33	165
55.0%	99	50	35	64	1188	594	545	643	4158	4	2	0	5	48	24	14	34	166
55.5%	100	50	36	64	1199	599	550	648	4196	4	2	0	5	48	24	14	34	168
56.0%	101	50	36	65	1210	605	556	654	4234	4	2	0	5	48	24	14	34	169
56.5%	102	51	37	65	1220	610	561	660	4271	4	2	0	5	49	24	15	34	171
57.0%	103	51	37	66	1231	616	566	665	4309	4	2	0	5	49	25	15	35	172
57.5%	104	52	37	66	1242	621	571	671	4347	4	2	0	5	50	25	15	35	174
58.0%	104	52	38	67	1253	626	576	676	4385	4	2	0	5	50	25	15	35	175
58.5%	105	53	38	67	1264	632	582	682	4423	4	2	0	5	51	25	15	35	177
59.0%	106	53	39	68	1274	637	587	688	4460	4	2	0	5	51	25	15	36	178
59.5%	107	54	39	68	1285	643	592	693	4498	4	2	0	5	51	26	16	36	180
60.0%	108	54	39	69	1296	648	597	699	4536	4	2	0	5	52	26	16	36	181
60.5%	109	54	40	69	1307	653	602	705	4574	4	2	0	5	52	26	16	36	183
61.0%	110	55	40	70	1318	659	607	710	4612	4	2	0	5	53	26	16	37	184
61.5%	111	55	40	70	1328	664	613	716	4649	4	2	0	5	53	27	16	37	186
62.0%	112	56	41	71	1339	670	618	721	4687	4	2	0	5	54	27	16	37	187
62.5%	113	56	41	71	1350	675	623	727	4725	5	2	0	5	54	27	17	37	189
63.0%	113	57	42	72	1361	680	628	733	4763	5	2	0	5	54	27	17	38	191

Table C.3/M.2101.1 – Allocated performance objectives for VC-3

	VC-3 ES Objectives (PO=3.75%)									VC-3 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-3 Path Alloc.	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO
0.5%	1	1	0	2	16	8	2	14	57	0	0	0	0	0	0	0	1	2
1.0%	3	1	0	4	32	16	8	24	113	0	0	0	0	1	0	0	2	3
1.5%	4	2	0	5	49	24	14	34	170	0	0	0	1	1	1	0	2	5
2.0%	5	3	0	6	65	32	21	44	227	0	0	0	1	2	1	0	3	6
2.5%	7	3	0	7	81	41	28	53	284	0	0	0	1	2	1	0	3	8
3.0%	8	4	0	8	97	49	35	63	340	0	0	0	1	3	1	0	4	9
3.5%	9	5	0	9	113	57	42	72	397	0	0	0	1	3	2	0	4	11
4.0%	11	5	1	10	130	65	49	81	454	0	0	0	1	3	2	0	4	12
4.5%	12	6	1	11	146	73	56	90	510	0	0	0	1	4	2	0	5	14
5.0%	14	7	2	12	162	81	63	99	567	0	0	0	1	4	2	0	5	15

Table C.3/M.2101.1 – Allocated performance objectives for VC-3 *(continued)*

	VC-3 ES Objectives (PO=3.75%)									VC-3 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-3 Path Alloc.	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO
5.5%	15	7	2	13	178	89	70	108	624	0	0	0	1	5	2	0	5	17
6.0%	16	8	2	14	194	97	77	117	680	0	0	0	1	5	3	0	6	18
6.5%	18	9	3	15	211	105	85	126	737	0	0	0	1	6	3	0	6	20
7.0%	19	9	3	16	227	113	92	135	794	1	0	0	1	6	3	0	7	21
7.5%	20	10	4	16	243	122	99	144	851	1	0	0	1	6	3	0	7	23
8.0%	22	11	4	17	259	130	107	152	907	1	0	0	1	7	3	0	7	24
8.5%	23	11	5	18	275	138	114	161	964	1	0	0	1	7	4	0	8	26
9.0%	24	12	5	19	292	146	122	170	1021	1	0	0	1	8	4	0	8	27
9.5%	26	13	6	20	308	154	129	179	1077	1	0	0	2	8	4	0	8	29
10.0%	27	14	6	21	324	162	137	187	1134	1	0	0	2	9	4	0	8	30
10.5%	28	14	7	22	340	170	144	196	1191	1	0	0	2	9	5	0	9	32
11.0%	30	15	7	23	356	178	152	205	1247	1	0	0	2	10	5	0	9	33
11.5%	31	16	8	23	373	186	159	214	1304	1	0	0	2	10	5	1	9	35
12.0%	32	16	8	24	389	194	167	222	1361	1	0	0	2	10	5	1	10	36
12.5%	34	17	9	25	405	203	174	231	1418	1	0	0	2	11	5	1	10	38
13.0%	35	18	9	26	421	211	182	240	1474	1	0	0	2	11	6	1	10	39
13.5%	36	18	10	27	437	219	189	248	1531	1	0	0	2	12	6	1	11	41
14.0%	38	19	10	28	454	227	197	257	1588	1	1	0	2	12	6	1	11	42
14.5%	39	20	11	28	470	235	204	266	1644	1	1	0	2	13	6	1	11	44
15.0%	41	20	11	29	486	243	212	274	1701	1	1	0	2	13	6	1	12	45
15.5%	42	21	12	30	502	251	219	283	1758	1	1	0	2	13	7	2	12	47
16.0%	43	22	12	31	518	259	227	291	1814	1	1	0	2	14	7	2	12	48
16.5%	45	22	13	32	535	267	235	300	1871	1	1	0	2	14	7	2	12	50
17.0%	46	23	13	33	551	275	242	309	1928	1	1	0	2	15	7	2	13	51
17.5%	47	24	14	33	567	284	250	317	1985	1	1	0	2	15	8	2	13	53
18.0%	49	24	14	34	583	292	257	326	2041	1	1	0	2	16	8	2	13	54
18.5%	50	25	15	35	599	300	265	334	2098	1	1	0	2	16	8	2	14	56
19.0%	51	26	16	36	616	308	273	343	2155	1	1	0	2	16	8	2	14	57
19.5%	53	26	16	37	632	316	280	351	2211	1	1	0	2	17	8	3	14	59
20.0%	54	27	17	37	648	324	288	360	2268	1	1	0	2	17	9	3	15	60
20.5%	55	28	17	38	664	332	296	369	2325	1	1	0	2	18	9	3	15	62
21.0%	57	28	18	39	680	340	303	377	2381	2	1	0	2	18	9	3	15	64
21.5%	58	29	18	40	697	348	311	386	2438	2	1	0	3	19	9	3	15	65
22.0%	59	30	19	41	713	356	319	394	2495	2	1	0	3	19	10	3	16	67
22.5%	61	30	19	41	729	365	326	403	2552	2	1	0	3	19	10	3	16	68
23.0%	62	31	20	42	745	373	334	411	2608	2	1	0	3	20	10	4	16	70
23.5%	63	32	20	43	761	381	342	420	2665	2	1	0	3	20	10	4	17	71
24.0%	65	32	21	44	778	389	349	428	2722	2	1	0	3	21	10	4	17	73
24.5%	66	33	22	45	794	397	357	437	2778	2	1	0	3	21	11	4	17	74
25.0%	68	34	22	45	810	405	365	445	2835	2	1	0	3	22	11	4	17	76
25.5%	69	34	23	46	826	413	372	454	2892	2	1	0	3	22	11	4	18	77
26.0%	70	35	23	47	842	421	380	462	2948	2	1	0	3	22	11	5	18	79

Table C.3/M.2101.1 – Allocated performance objectives for VC-3 *(continued)*

	VC-3 ES Objectives (PO=3.75%)									VC-3 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-3 Path Alloc.	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO
26.5%	72	36	24	48	859	429	388	471	3005	2	1	0	3	23	11	5	18	80
27.0%	73	36	24	49	875	437	396	479	3062	2	1	0	3	23	12	5	18	82
27.5%	74	37	25	49	891	446	403	488	3119	2	1	0	3	24	12	5	19	83
28.0%	76	38	26	50	907	454	411	496	3175	2	1	0	3	24	12	5	19	85
28.5%	77	38	26	51	923	462	419	505	3232	2	1	0	3	25	12	5	19	86
29.0%	78	39	27	52	940	470	426	513	3289	2	1	0	3	25	13	5	20	88
29.5%	80	40	27	52	956	478	434	522	3345	2	1	0	3	25	13	6	20	89
30.0%	81	41	28	53	972	486	442	530	3402	2	1	0	3	26	13	6	20	91
30.5%	82	41	28	54	988	494	450	539	3459	2	1	0	3	26	13	6	20	92
31.0%	84	42	29	55	1004	502	457	547	3515	2	1	0	3	27	13	6	21	94
31.5%	85	43	29	56	1021	510	465	555	3572	2	1	0	3	27	14	6	21	95
32.0%	86	43	30	56	1037	518	473	564	3629	2	1	0	3	28	14	6	21	97
32.5%	88	44	31	57	1053	527	481	572	3686	2	1	0	3	28	14	7	22	98
33.0%	89	45	31	58	1069	535	488	581	3742	2	1	0	3	29	14	7	22	100
33.5%	90	45	32	59	1085	543	496	589	3799	2	1	0	3	29	14	7	22	101
34.0%	92	46	32	59	1102	551	504	598	3856	2	1	0	3	29	15	7	22	103
34.5%	93	47	33	60	1118	559	512	606	3912	2	1	0	3	30	15	7	23	104
35.0%	95	47	34	61	1134	567	519	615	3969	3	1	0	4	30	15	7	23	106
35.5%	96	48	34	62	1150	575	527	623	4026	3	1	0	4	31	15	8	23	107
36.0%	97	49	35	63	1166	583	535	631	4082	3	1	0	4	31	16	8	23	109
36.5%	99	49	35	63	1183	591	543	640	4139	3	1	0	4	32	16	8	24	110
37.0%	100	50	36	64	1199	599	550	648	4196	3	1	0	4	32	16	8	24	112
37.5%	101	51	36	65	1215	608	558	657	4253	3	1	0	4	32	16	8	24	113
38.0%	103	51	37	66	1231	616	566	665	4309	3	1	0	4	33	16	8	25	115
38.5%	104	52	38	66	1247	624	574	674	4366	3	1	0	4	33	17	8	25	116
39.0%	105	53	38	67	1264	632	582	682	4423	3	1	0	4	34	17	9	25	118
39.5%	107	53	39	68	1280	640	589	690	4479	3	1	0	4	34	17	9	25	119
40.0%	108	54	39	69	1296	648	597	699	4536	3	1	0	4	35	17	9	26	121
40.5%	109	55	40	69	1312	656	605	707	4593	3	1	0	4	35	17	9	26	122
41.0%	111	55	40	70	1328	664	613	716	4649	3	1	0	4	35	18	9	26	124
41.5%	112	56	41	71	1345	672	620	724	4706	3	1	0	4	36	18	9	26	125
42.0%	113	57	42	72	1361	680	628	733	4763	3	2	0	4	36	18	10	27	127
42.5%	115	57	42	73	1377	689	636	741	4820	3	2	0	4	37	18	10	27	129
43.0%	116	58	43	73	1393	697	644	749	4876	3	2	0	4	37	19	10	27	130
43.5%	117	59	43	74	1409	705	652	758	4933	3	2	0	4	38	19	10	27	132
44.0%	119	59	44	75	1426	713	659	766	4990	3	2	0	4	38	19	10	28	133
44.5%	120	60	45	76	1442	721	667	775	5046	3	2	0	4	38	19	10	28	135
45.0%	122	61	45	76	1458	729	675	783	5103	3	2	0	4	39	19	11	28	136
45.5%	123	61	46	77	1474	737	683	791	5160	3	2	0	4	39	20	11	29	138
46.0%	124	62	46	78	1490	745	691	800	5216	3	2	0	4	40	20	11	29	139
46.5%	126	63	47	79	1507	753	698	808	5273	3	2	0	4	40	20	11	29	141
47.0%	127	63	48	79	1523	761	706	817	5330	3	2	0	4	41	20	11	29	142

Table C.3/M.2101.1 – Allocated performance objectives for VC-3 *(concluded)*

	VC-3 ES Objectives (PO=3.75%)									VC-3 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-3 Path Alloc.	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO
47.5%	128	64	48	80	1539	770	714	825	5387	3	2	0	4	41	21	11	30	144
48.0%	130	65	49	81	1555	778	722	833	5443	3	2	0	4	41	21	12	30	145
48.5%	131	65	49	82	1571	786	730	842	5500	3	2	0	4	42	21	12	30	147
49.0%	132	66	50	82	1588	794	737	850	5557	4	2	0	4	42	21	12	30	148
49.5%	134	67	50	83	1604	802	745	859	5613	4	2	0	4	43	21	12	31	150
50.0%	135	68	51	84	1620	810	753	867	5670	4	2	0	4	43	22	12	31	151
50.5%	136	68	52	85	1636	818	761	875	5727	4	2	0	5	44	22	12	31	153
51.0%	138	69	52	85	1652	826	769	884	5783	4	2	0	5	44	22	13	31	154
51.5%	139	70	53	86	1669	834	777	892	5840	4	2	0	5	44	22	13	32	156
52.0%	140	70	53	87	1685	842	784	900	5897	4	2	0	5	45	22	13	32	157
52.5%	142	71	54	88	1701	851	792	909	5954	4	2	0	5	45	23	13	32	159
53.0%	143	72	55	88	1717	859	800	917	6010	4	2	0	5	46	23	13	32	160
53.5%	144	72	55	89	1733	867	808	926	6067	4	2	0	5	46	23	13	33	162
54.0%	146	73	56	90	1750	875	816	934	6124	4	2	0	5	47	23	14	33	163
54.5%	147	74	56	91	1766	883	823	942	6180	4	2	0	5	47	24	14	33	165
55.0%	149	74	57	91	1782	891	831	951	6237	4	2	0	5	48	24	14	34	166
55.5%	150	75	58	92	1798	899	839	959	6294	4	2	0	5	48	24	14	34	168
56.0%	151	76	58	93	1814	907	847	967	6350	4	2	0	5	48	24	14	34	169
56.5%	153	76	59	94	1831	915	855	976	6407	4	2	0	5	49	24	15	34	171
57.0%	154	77	59	94	1847	923	863	984	6464	4	2	0	5	49	25	15	35	172
57.5%	155	78	60	95	1863	932	870	993	6521	4	2	0	5	50	25	15	35	174
58.0%	157	78	61	96	1879	940	878	1001	6577	4	2	0	5	50	25	15	35	175
58.5%	158	79	61	97	1895	948	886	1009	6634	4	2	0	5	51	25	15	35	177
59.0%	159	80	62	97	1912	956	894	1018	6691	4	2	0	5	51	25	15	36	178
59.5%	161	80	62	98	1928	964	902	1026	6747	4	2	0	5	51	26	16	36	180
60.0%	162	81	63	99	1944	972	910	1034	6804	4	2	0	5	52	26	16	36	181
60.5%	163	82	64	100	1960	980	917	1043	6861	4	2	0	5	52	26	16	36	183
61.0%	165	82	64	100	1976	988	925	1051	6917	4	2	0	5	53	26	16	37	184
61.5%	166	83	65	101	1993	996	933	1059	6974	4	2	0	5	53	27	16	37	186
62.0%	167	84	65	102	2009	1004	941	1068	7031	4	2	0	5	54	27	16	37	187
62.5%	169	84	66	103	2025	1013	949	1076	7088	5	2	0	5	54	27	17	37	189
63.0%	170	85	67	103	2041	1021	957	1084	7144	5	2	0	5	54	27	17	38	191

Table C.4/M.2101.1 – Allocated performance objectives for VC-4

	VC-4 ES Objectives (PO=8%)									VC-4 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-4 Path Alloc.	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO
0.5%	3	1	0	4	35	17	9	26	121	0	0	0	0	0	0	0	1	2
1.0%	6	3	0	6	69	35	23	46	242	0	0	0	0	1	0	0	2	3
1.5%	9	4	0	8	104	52	37	66	363	0	0	0	1	1	1	0	2	5
2.0%	12	6	1	11	138	69	52	86	484	0	0	0	1	2	1	0	3	6
2.5%	14	7	2	13	173	86	68	105	605	0	0	0	1	2	1	0	3	8
3.0%	17	9	3	15	207	104	83	124	726	0	0	0	1	3	1	0	4	9
3.5%	20	10	4	16	242	121	99	143	847	0	0	0	1	3	2	0	4	11
4.0%	23	12	5	18	276	138	115	162	968	0	0	0	1	3	2	0	4	12
4.5%	26	13	6	20	311	156	131	180	1089	0	0	0	1	4	2	0	5	14
5.0%	29	14	7	22	346	173	147	199	1210	0	0	0	1	4	2	0	5	15
5.5%	32	16	8	24	380	190	163	218	1331	0	0	0	1	5	2	0	5	17
6.0%	35	17	9	26	415	207	179	236	1452	0	0	0	1	5	3	0	6	18
6.5%	37	19	10	27	449	225	195	255	1572	0	0	0	1	6	3	0	6	20
7.0%	40	20	11	29	484	242	211	273	1693	1	0	0	1	6	3	0	7	21
7.5%	43	22	12	31	518	259	227	291	1814	1	0	0	1	6	3	0	7	23
8.0%	46	23	13	33	553	276	243	310	1935	1	0	0	1	7	3	0	7	24
8.5%	49	24	15	34	588	294	259	328	2056	1	0	0	1	7	4	0	8	26
9.0%	52	26	16	36	622	311	276	346	2177	1	0	0	1	8	4	0	8	27
9.5%	55	27	17	38	657	328	292	365	2298	1	0	0	2	8	4	0	8	29
10.0%	58	29	18	40	691	346	308	383	2419	1	0	0	2	9	4	0	8	30
10.5%	60	30	19	41	726	363	325	401	2540	1	0	0	2	9	5	0	9	32
11.0%	63	32	20	43	760	380	341	419	2661	1	0	0	2	10	5	0	9	33
11.5%	66	33	22	45	795	397	358	437	2782	1	0	0	2	10	5	1	9	35
12.0%	69	35	23	46	829	415	374	455	2903	1	0	0	2	10	5	1	10	36
12.5%	72	36	24	48	864	432	390	474	3024	1	0	0	2	11	5	1	10	38
13.0%	75	37	25	50	899	449	407	492	3145	1	0	0	2	11	6	1	10	39
13.5%	78	39	26	51	933	467	423	510	3266	1	0	0	2	12	6	1	11	41
14.0%	81	40	28	53	968	484	440	528	3387	1	1	0	2	12	6	1	11	42
14.5%	84	42	29	55	1002	501	456	546	3508	1	1	0	2	13	6	1	11	44
15.0%	86	43	30	56	1037	518	473	564	3629	1	1	0	2	13	6	1	12	45
15.5%	89	45	31	58	1071	536	489	582	3750	1	1	0	2	13	7	2	12	47
16.0%	92	46	33	60	1106	553	506	600	3871	1	1	0	2	14	7	2	12	48
16.5%	95	48	34	61	1140	570	522	618	3992	1	1	0	2	14	7	2	12	50
17.0%	98	49	35	63	1175	588	539	636	4113	1	1	0	2	15	7	2	13	51
17.5%	101	50	36	65	1210	605	556	654	4234	1	1	0	2	15	8	2	13	53
18.0%	104	52	37	66	1244	622	572	672	4355	1	1	0	2	16	8	2	13	54
18.5%	107	53	39	68	1279	639	589	690	4476	1	1	0	2	16	8	2	14	56
19.0%	109	55	40	70	1313	657	605	708	4596	1	1	0	2	16	8	2	14	57
19.5%	112	56	41	71	1348	674	622	726	4717	1	1	0	2	17	8	3	14	59
20.0%	115	58	42	73	1382	691	639	744	4838	1	1	0	2	17	9	3	15	60
20.5%	118	59	44	74	1417	708	655	762	4959	1	1	0	2	18	9	3	15	62
21.0%	121	60	45	76	1452	726	672	780	5080	2	1	0	2	18	9	3	15	64

Table C.4/M.2101.1 – Allocated performance objectives for VC-4 *(continued)*

	VC-4 ES Objectives (PO=8%)									VC-4 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-4 Path Alloc.	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO
21.5%	124	62	46	78	1486	743	689	798	5201	2	1	0	3	19	9	3	15	65
22.0%	127	63	47	79	1521	760	705	815	5322	2	1	0	3	19	10	3	16	67
22.5%	130	65	49	81	1555	778	722	833	5443	2	1	0	3	19	10	3	16	68
23.0%	132	66	50	83	1590	795	738	851	5564	2	1	0	3	20	10	4	16	70
23.5%	135	68	51	84	1624	812	755	869	5685	2	1	0	3	20	10	4	17	71
24.0%	138	69	52	86	1659	829	772	887	5806	2	1	0	3	21	10	4	17	73
24.5%	141	71	54	87	1693	847	789	905	5927	2	1	0	3	21	11	4	17	74
25.0%	144	72	55	89	1728	864	805	923	6048	2	1	0	3	22	11	4	17	76
25.5%	147	73	56	91	1763	881	822	941	6169	2	1	0	3	22	11	4	18	77
26.0%	150	75	58	92	1797	899	839	959	6290	2	1	0	3	22	11	5	18	79
26.5%	153	76	59	94	1832	916	855	976	6411	2	1	0	3	23	11	5	18	80
27.0%	156	78	60	95	1866	933	872	994	6532	2	1	0	3	23	12	5	18	82
27.5%	158	79	61	97	1901	950	889	1012	6653	2	1	0	3	24	12	5	19	83
28.0%	161	81	63	99	1935	968	905	1030	6774	2	1	0	3	24	12	5	19	85
28.5%	164	82	64	100	1970	985	922	1048	6895	2	1	0	3	25	12	5	19	86
29.0%	167	84	65	102	2004	1002	939	1066	7016	2	1	0	3	25	13	5	20	88
29.5%	170	85	67	103	2039	1020	956	1083	7137	2	1	0	3	25	13	6	20	89
30.0%	173	86	68	105	2074	1037	972	1101	7258	2	1	0	3	26	13	6	20	91
30.5%	176	88	69	107	2108	1054	989	1119	7379	2	1	0	3	26	13	6	20	92
31.0%	179	89	70	108	2143	1071	1006	1137	7500	2	1	0	3	27	13	6	21	94
31.5%	181	91	72	110	2177	1089	1023	1155	7620	2	1	0	3	27	14	6	21	95
32.0%	184	92	73	111	2212	1106	1039	1172	7741	2	1	0	3	28	14	6	21	97
32.5%	187	94	74	113	2246	1123	1056	1190	7862	2	1	0	3	28	14	7	22	98
33.0%	190	95	76	114	2281	1141	1073	1209	7983	2	1	0	3	29	14	7	22	100
33.5%	193	97	77	117	2316	1158	1090	1226	8104	2	1	0	3	29	14	7	22	101
34.0%	196	98	78	118	2350	1175	1106	1244	8225	2	1	0	3	29	15	7	22	103
34.5%	199	100	80	120	2385	1193	1124	1262	8346	2	1	0	3	30	15	7	23	104
35.0%	202	101	81	121	2419	1210	1140	1280	8467	3	2	0	5	30	15	7	23	106
35.5%	204	102	82	122	2454	1227	1157	1297	8588	3	2	0	5	31	15	8	23	107
36.0%	207	104	84	124	2488	1244	1173	1315	8709	3	2	0	5	31	16	8	23	109
36.5%	210	105	85	125	2523	1262	1191	1333	8830	3	2	0	5	32	16	8	24	110
37.0%	213	107	86	128	2557	1279	1207	1351	8951	3	2	0	5	32	16	8	24	112
37.5%	216	108	87	129	2592	1296	1224	1368	9072	3	2	0	5	32	16	8	24	113
38.0%	219	110	89	131	2627	1314	1242	1386	9193	3	2	0	5	33	16	8	25	115
38.5%	222	111	90	132	2661	1331	1258	1404	9314	3	2	0	5	33	17	8	25	116
39.0%	225	113	92	134	2696	1348	1275	1421	9435	3	2	0	5	34	17	9	25	118
39.5%	228	114	93	135	2730	1365	1291	1439	9556	3	2	0	5	34	17	9	25	119
40.0%	230	115	94	136	2765	1383	1309	1457	9677	3	2	0	5	35	17	9	26	121
40.5%	233	117	95	139	2799	1400	1325	1475	9798	3	2	0	5	35	17	9	26	122
41.0%	236	118	96	140	2834	1417	1342	1492	9919	3	2	0	5	35	18	9	26	124
41.5%	239	120	98	142	2868	1434	1358	1510	10040	3	2	0	5	36	18	9	26	125
42.0%	242	121	99	143	2903	1452	1376	1528	10161	3	2	0	5	36	18	10	27	127

Table C.4/M.2101.1 – Allocated performance objectives for VC-4 *(concluded)*

	VC-4 ES Objectives (PO=8%)									VC-4 SES Objectives (PO=0.1%)								
	2 hours				1 day				7 days	2 hours				1 day				7 days
VC-4 Path Alloc.	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO	APO	BISO	S1	S2	APO	BISO	S1	S2	BISO
42.5%	245	123	101	145	2938	1469	1392	1546	10282	3	2	0	5	37	18	10	27	129
43.0%	248	124	102	146	2972	1486	1409	1563	10403	3	2	0	5	37	19	10	27	130
43.5%	251	126	104	148	3007	1504	1426	1582	10524	3	2	0	5	38	19	10	27	132
44.0%	253	127	104	150	3041	1521	1443	1599	10644	3	2	0	5	38	19	10	28	133
44.5%	256	128	105	151	3076	1538	1460	1616	10765	3	2	0	5	38	19	10	28	135
45.0%	259	130	107	153	3110	1555	1476	1634	10886	3	2	0	5	39	19	11	28	136
45.5%	262	131	108	154	3145	1573	1494	1652	11007	3	2	0	5	39	20	11	29	138
46.0%	265	133	110	156	3180	1590	1510	1670	11128	3	2	0	5	40	20	11	29	139
46.5%	268	134	111	157	3214	1607	1527	1687	11249	3	2	0	5	40	20	11	29	141
47.0%	271	136	113	159	3249	1625	1544	1706	11370	3	2	0	5	41	20	11	29	142
47.5%	274	137	114	160	3283	1642	1561	1723	11491	3	2	0	5	41	21	11	30	144
48.0%	276	138	115	161	3318	1659	1578	1740	11612	3	2	0	5	41	21	12	30	145
48.5%	279	140	116	164	3352	1676	1594	1758	11733	3	2	0	5	42	21	12	30	147
49.0%	282	141	117	165	3387	1694	1612	1776	11854	4	2	0	5	42	21	12	30	148
49.5%	285	143	119	167	3421	1711	1628	1794	11975	4	2	0	5	43	21	12	31	150
50.0%	288	144	120	168	3456	1728	1645	1811	12096	4	2	0	5	43	22	12	31	151
50.5%	291	146	122	170	3491	1746	1662	1830	12217	4	2	0	5	44	22	12	31	153
51.0%	294	147	123	171	3525	1763	1679	1847	12338	4	2	0	5	44	22	13	31	154
51.5%	297	149	125	173	3560	1780	1696	1864	12459	4	2	0	5	44	22	13	32	156
52.0%	300	150	126	174	3594	1797	1712	1882	12580	4	2	0	5	45	22	13	32	157
52.5%	302	151	126	176	3629	1815	1730	1900	12701	4	2	0	5	45	23	13	32	159
53.0%	305	153	128	178	3663	1832	1746	1918	12822	4	2	0	5	46	23	13	32	160
53.5%	308	154	129	179	3698	1849	1763	1935	12943	4	2	0	5	46	23	13	33	162
54.0%	311	156	131	181	3732	1866	1780	1952	13064	4	2	0	5	47	23	14	33	163
54.5%	314	157	132	182	3767	1884	1797	1971	13185	4	2	0	5	47	24	14	33	165
55.0%	317	159	134	184	3802	1901	1814	1988	13306	4	2	0	5	48	24	14	34	166
55.5%	320	160	135	185	3836	1918	1830	2006	13427	4	2	0	5	48	24	14	34	168
56.0%	323	162	137	187	3871	1936	1848	2024	13548	4	2	0	5	48	24	14	34	169
56.5%	325	163	137	189	3905	1953	1865	2041	13668	4	2	0	5	49	24	15	34	171
57.0%	328	164	138	190	3940	1970	1881	2059	13789	4	2	0	5	49	25	15	35	172
57.5%	331	166	140	192	3974	1987	1898	2076	13910	4	2	0	5	50	25	15	35	174
58.0%	334	167	141	193	4009	2005	1915	2095	14031	4	2	0	5	50	25	15	35	175
58.5%	337	169	143	195	4044	2022	1932	2112	14152	4	2	0	5	51	25	15	35	177
59.0%	340	170	144	196	4078	2039	1949	2129	14273	4	2	0	5	51	25	15	36	178
59.5%	343	172	146	198	4113	2057	1966	2148	14394	4	2	0	5	51	26	16	36	180
60.0%	346	173	147	199	4147	2074	1983	2165	14515	4	2	0	5	52	26	16	36	181
60.5%	348	174	148	200	4182	2091	2000	2182	14636	4	2	0	5	52	26	16	36	183
61.0%	351	176	149	203	4216	2108	2016	2200	14757	4	2	0	5	53	26	16	37	184
61.5%	354	177	150	204	4251	2126	2034	2218	14878	4	2	0	5	53	27	16	37	186
62.0%	357	179	152	206	4285	2143	2050	2236	14999	4	2	0	5	54	27	16	37	187
62.5%	360	180	153	207	4320	2160	2067	2253	15120	5	3	0	6	54	27	17	37	189
63.0%	363	182	155	209	4355	2178	2085	2271	15241	5	3	0	6	54	27	17	38	191

Table C.5/M.2101.1 – Allocated performance objectives for STM-1

	STM-1 ES Objectives (PO=80%)									STM-1 SES Objectives (PO-0.1%)								
STM-1 MS	**2 hours**				**1 day**				**7 days**	**2 hours**				**1 day**				**7 days**
Alloc.	**APO**	**BISO**	**S1**	**S2**	**APO**	**BISPO**	**S1**	**S2**	**BISPO**	**APO**	**BISPO**	**S1**	**S2**	**APO**	**BISPO**	**S1**	**S2**	**BISPO**
0.2%	1	0	0	1	14	1	0	4	10	0	0	0	0	0	0	0	0	0
0.5%	3	0	0	1	35	3	0	7	24	0	0	0	0	0	0	0	0	0
FFS																		

Table C.6/M.2101.1 – Allocated performance objectives for STM-4, 16 and 64

	STM-X (X=4, 16, 64) ES Objectives (PO=N/A)									STM-X (X=4, 16, 64) SES Objectives (PO=0.1%)								
STM-X MS	**2 hours**				**1 day**				**7 days**	**2 hours**				**1 day**				**7 days**
Alloc.	**APO**	**BISO**	**S1**	**S2**	**APO**	**BISPO**	**S1**	**S2**	**BISPO**	**APO**	**BISPO**	**S1**	**S2**	**APO**	**BISPO**	**S1**	**S2**	**BISPO**
0.2%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0	0	0
0.5%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0	0	0	0
FFS																		

ANNEX D

Default Unacceptable Performance Level threshold values

Table D.1/M.2101.1 – Default unacceptable performance level threshold values for international synchronous digital paths and multiplex sections at a fixed 15-minute period

Digital paths – Set thresholds				
	VC-1	**VC-2**	**VC-3**	**VC-4**
ES	120	120	150	180
SES	15	15	15	15
Digital paths – Reset thresholds				
	VC-1	**VC-2**	**VC-3**	**VC-4**
ES	FFS	FFS	FFS	FFS
SES	0	0	0	0
Multiplex sections – Set thresholds				
	STM-1	**STM-4**	**STM-16**	**STM-64**
ES	50	FFS	FFS	FFS
SES	10	10	10	10
Multiplex sections – Reset thresholds				
	STM-1	**STM-4**	**STM-16**	**STM-64**
ES	FFS	FFS	FFS	FFS
SES	0	0	0	0

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