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ITU-T E.451

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SERIES E: OVERALL NETWORK OPERATION, TELEPHONE SERVICE, SERVICE OPERATION AND HUMAN FACTORS

Network management – Checking the quality of the international telephone service

Facsimile call cut-off performance

ITU-T Recommendation E.451

(Formerly CCITT Recommendation)

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ITU-T Recommendation E.451

Facsimile call cut-off performance

Summary

The metrics defined in this Recommendation are intended for use when data is collected using the intrusive test call based method defined in ITU E.457. Metrics representing call cut-off performance for high speed facsimile, i.e. facsimile using V.34 modulation in accordance with Annex F/T.30, can be found in ITU-T E.460.

Source

ITU-T Recommendation E.451 was revised by ITU-T Study Group 2 (2001-2004) and approved under the WTSA Resolution 1 procedure on 2 February 2001.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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Facsimile call cut-off performance

1 Introduction

Call cut-off is one of the most important factors that affect the quality of service for facsimile applications on PSTN. Facsimile cut-offs can occur in various phases of a facsimile call and the failure modes can be quite complex. The cut-off ratio may be defined in general, as the percentage of established facsimile calls that are terminated prior to the transmittal of all the pages in the facsimile transaction. Since the failure modes are complex, it is important to define cut-offs precisely so that valid comparisons can be made between cut-off ratio measurements from a variety of sources. The focus of the definitions is on test calls that follow certain rules and the definitions are developed from the perspective of the transmitting terminal. Uniformly, the terminology in ITU-T T.30 has been employed.

The metrics defined in this Recommendation are intended for use when data is collected using the intrusive test call based method defined in ITU-T E.457. Metrics representing call cut-off performance for high speed facsimile, i.e. facsimile using V.34 modulation in accordance with Annex F/T.30, can be found in ITU-T E.460.

When collecting and assessing Facsimile Call Cut-off data it may be important for ROAs to examine the cause of observed failures.

2 References

The following ITU-T Recommendations and other references contain provisions, which, through reference in this text, constitute provisions of this Recommandation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; 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 Recommandations is regularly published.

– ITU-T E.450 (1998), *Facsimile quality of service on public networks – General aspects.*

– ITU-T E.456 (1998), *Test transaction for facsimile transmission performance.*

– ITU-T E.457 (1996), *Facsimile measurement methodologies.*

– ITU-T E.460 (2000), *Measurements and metrics for monitoring the performance of V.34 Group 3 Facsimile.*

– ITU-T T.30 (1999), *Procedures for document facsimile transmission in the general switched telephone network.*

3 Scope

The definitions in clause 4 below apply to test calls:

a) that use automatic-to-automatic scenario (method No. 4 in Table 1/T.30) and may be adapted for other methods in the same table;

b) that use standard test transactions as defined in ITU-T E.456.

c) where the intended receiving facsimile terminal has responded by going off-hook and CED has been received at the originating terminal [see clause 5e)];

d) that are sent to a receiving facsimile terminal that is connected to a dedicated line and not shared with voice terminals.

4 Definitions

This Recommendation defines the following terms:

a) A **pre-message phase B failure** is considered to have occurred if prior to the transmittal of the first page, either the originating or the terminating facsimile terminal goes on-hook prior to the reception of a CFR message by the originating terminal.

A **post-message phase B failure** is considered to have occurred if a phase B failure occurs after the transmission of any page.

b) A **phase C/phase D failure at any page** is considered to have occurred if a valid post message response (MCF, RTP, RTN, PIN, PIP) is not received in response to either the MPS or the EOP message. If this occurs at *m*th page, then $m - 1$ pages are considered to be successfully transmitted but one can consider that there was a failure at the *m*th page.

c) When transmitting N-page transactions, the **facsimile call cut-off ratio (expressed as a percentage) for N pages** is

$$\%C_N = (F_N / T) \times 100$$

where F_N is the number of transactions where there was either a phase B, C, or D failure, and T is the total number of transactions satisfying the conditions in clause 3.

d) Based on the definition in item c) above, **facsimile call cut-off ratios for *m* pages** ($1 \leq m < N$) is

$$\%C_m = (F_m / T) \times 100$$

where F_m is the number of transactions that had a phase B, C or D failure at the *m*th page.

e) The **cut-off ratio for transactions for which a pre-message phase B failure occurs** is

$$\%C_{1B} = (F_{1B} / T) \times 100$$

where F_{lB} is the number of transactions with a pre-picture phase B failure.

f) Given that conditions a) to d) in clause 3 have been satisfied, it is possible to define conditional facsimile success (CFS) ratios which are the complements of cutoff ratios:

$$\%CFS_N = 100 - \%C_N$$

$$\%CFS_m = 100 - \%C_m$$

$$\%CFS_{1B} = 100 - \%C_{1B}$$

g) End-to-end facsimile success (FS) ratios can be defined as follows:

$$\%FS_N = PACR \times \%CFS_N$$

$$\%FS_m = PACR \times \%CFS_m$$

$$\%FS_{1B} = PACR \times \%CFS_{1B}$$

The FSs represent the true facsimile success performance observed by the customers. The ratio PACR is the phase A completion ratio and is dependent on several factors. These factors include network blocking, terminal availability, proper operation of the terminating facsimile terminal and correct reception of the CED signal by the originating terminal.

5 Remarks

a) During test calls, retransmissions of pages may occur. The retransmitted pages are not counted for computing call cut-off ratios. For example, if retransmissions occur prior to the *m*th page of the original document followed by a failure at the *m*th page, it is still counted as a cut-off at the *m*th page.

b) A test transaction of 3 pages as defined in ITU-T E.456 shall be used.

c) For manual to automatic test calls (method No. 2 in Table 1/T.30) there are no changes in definitions contained in clause 4 provided that there are no operator errors.

d) From a measurement point of view, the precise evaluation of cut-off ratios C_N requires that the T.30 HDLC protocol messages be monitored and recorded during test transactions. This should not be a problem for specially constructed/configured test vehicles or network based monitoring systems.

e) If measurements are made between terminals from the same manufacturer that will result in the use of non-standard features, the possible impact of these features on cut-off ratios should be identified and understood.

f) Machines from some manufacturers disconnect on the receipt of an RTN while others do not. In the presence of network impairments, machines that disconnect on the receipt of an RTN may result in a higher facsimile call cut-off ratio compared to those machines that do not disconnect on the receipt of an RTN. Therefore, it is important to explicitly state the characteristics of machines such as the response to RTNs when comparing the results from the different machines.

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