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TELEPHONE NETWORK AND ISDN

**QUALITY OF SERVICE, NETWORK MANAGEMENT
AND TRAFFIC ENGINEERING**

**TEST TRANSACTION FOR FACSIMILE
TRANSMISSION PERFORMANCE**

ITU-T Recommendation E.456

Superseded by a more recent version

(Previously "CCITT Recommendation")

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FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The 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 Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation E.456 was prepared by ITU-T Study Group 2 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 12 th of August 1994.

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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SUMMARY

This Recommendation specifies a test transaction for use in other E-Series Recommendations that can help benchmark performance of transmission networks with respect to Group 3 facsimile. The basis for this Recommendation was an examination of facsimile caller behaviour on a worldwide scale. A test transaction composed of five pages of ITU-T Recommendation T.21 Test Chart No. 2 is recommended.

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Recommendation E.456

TEST TRANSACTION FOR FACSIMILE TRANSMISSION PERFORMANCE

(Geneva, 1994)

1 Introduction

Network characterization tests that are specifically designed to measure Group 3 facsimile performance must be well correlated with the typical experience of callers in order to be useful. The purpose of this Recommendation is to specify a test transaction for use in other E-Series Recommendations that can help benchmark performance of transmission networks with respect to Group 3 facsimile. The basis for this Recommendation was an examination of facsimile caller behaviour on a worldwide scale.

The associated E-Series Recommendations require a specified test transaction, in order to permit simple comparisons to objective requirements and further comparisons between measurements made by independent administrations. The associated Recommendations are E.451 "Facsimile Cut-off performance", E.452 "Facsimile modem speeds and transmission time" and E.453 "Facsimile image quality as corrupted by transmission-induced scan line errors".

The following points are to be noted:

- It is desirable to perform tests of current network connections with measurement devices whose results are easily related to performance from the typical user's viewpoint. This Recommendation provides the necessary foundation for such measurements.
- When considering the deployment of new technologies and equipment, it is important to assess any effects on present and wide-spread communications applications. Group 3 facsimile is one of many such applications, as it has become an integral part of international business. The test transaction specified here was chosen with knowledge of typical business transactions and takes them into account.

2 Specification of the test transaction

This clause defines the test transaction in terms of its size in pages, page composition and other important parameters (see Table 1).

3 Rationale for elements of the test transaction

Regarding the selection of ITU-T Recommendation T.21 Test Chart No. 2 as the test page, the following attributes were considered:

- a) In a transmission time comparison, ITU-T Recommendation T.21 Test Chart No. 2 is more representative than other test pages of the range of average page transmission times based on measurements on international facsimile calls estimated to be 31 seconds to 42 seconds. Since its transmission time is slightly longer than average, Test Chart No. 2 will represent a somewhat conservative measure of performance (which is considered acceptable in performance planning).
- b) The transmission time comparison was conducted using standard resolution as per ITU-T Recommendation T.4, which is the default resolution on virtually all facsimile machines and is likely to be used on a high percentage of facsimile calls placed by customers because of call duration-based billing. Therefore, the Recommendation for Test Chart No. 2 includes a Recommendation to use standard resolution in facsimile performance testing.

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- c) In a comparison of scan line length distributions, Test Chart No. 2 is more representative than other test pages of the distribution of a typical typed page that might be found in any office.
- d) It is an existing test chart, and it is widely available. Test Chart No. 2 also contains characters that represent many different languages and alphabets.
- e) It has a diagonal line for a major portion of the image area which facilitates manual image quality evaluation.
- f) Its transmission time permits the examination of multiple pages within a test transaction while maintaining a reasonable call holding time.

TABLE 1/E.456

Size, form and parameter settings for the test transaction

Parameter	Value
Test page	T.21 No. 2 (Note 1)
Transaction size	5 pages
Resolution	Standard (Note 2)
Minimum scan line length	20 ms, 10 ms
Scan line encoding method	Modified Huffman (1-D)
Page transmission method	Non-ECM (Note 3)
NOTES	
1 Slight modifications to the test chart will be permitted. For example, it is permissible to extend the diagonal line to the top and bottom margins of the page if manual page examination will be used.	
2 Recommendation T.4 Optional higher resolution (7.7 lines/mm) and Modified READ (2-D) coding are options for special studies.	
3 Testing in ECM mode is for further study.	

The test transaction size was selected to retain a manageable size, and present a call of reasonable duration. It is possible to complete a five-page call in less than 300 seconds when the test page is T.21 No. 2. The range of average pages per transaction based on measurements on international facsimile calls was 2.1 to 2.97. The five-page transaction is larger than this average, and a high percentage of customer transactions are believed to contain five pages or less, but the performance for transactions of size less than five pages can easily be determined from measurements using five pages.

Modified Huffman encoding is currently specified, since it is a standard capability identified in Recommendation T.4.

Non-ECM transmission of pages is required, since the proposed evaluation of page quality is based on measurement of errored scan line distributions.