



# SLOVENSKI STANDARD

## SIST ETS 300 471:1998

01-oktober-1998

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Radio Equipment and Systems (RES); Land mobile service; Access protocol, occupation rules and corresponding technical characteristics of radio equipment for the transmission of data on shared channels

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#### **ICS:**

33.060.20	Sprejemna in oddajna oprema	Receiving and transmitting equipment
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**ETSI**

European Telecommunications Standards Institute

**ETSI Secretariat**

**Postal address:** F-06921 Sophia Antipolis CEDEX - FRANCE

**Office address:** 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE

**X.400:** c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

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## Foreword

The access protocol described in this ETS is based on the access protocol published as annex F of I-ETS 300 113 [3].

Transposition dates	
Date of adoption of this ETS:	17 November 1995
Date of latest announcement of this ETS (doa):	31 March 1996
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	30 September 1996
Date of withdrawal of any conflicting National Standard (dow):	30 September 1996

This ETS can be implemented for equipment meeting the requirements of ETSI standards e.g. ETS 300 113 [1] and ETS 300 390 [2].

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## 1 Scope

This ETS applies to equipment designed to operate within the professional mobile radio service and to the associated frequency planning.

This ETS applies to equipment for the transmission of data on shared channels; it also contains two methods of measurement used for the assessment of receiver timing parameters.

This ETS specifies an access protocol and occupation rules for data communications on radio channels shared by different users. It may be used for data communications over channels originally intended for speech use. This ETS gives freedom for the use of any bit rate, any constant envelope modulation or any type of protocol which fulfills the normative parameters of this ETS to access a shared radio channel.

The access protocol specified in this ETS also permits the sharing of speech and data communication.

This access protocol applies to single frequency simplex operation (and two frequency repeater operations with the repeater in duplex mode and the mobile units in simplex mode). This access protocol is applicable for:

- multiple data only users, independent of each other, which do not share a common central control facility, but may share a common single or two frequency radio channel;
- multiple mixed analogue speech and data users, independent from each other, which do not share a common central control facility, but may share a common single, or two frequency, radio channel and where speech is to have priority over data transmissions.

This access protocol is not applicable for data users with common central control facilities or for trunked systems operating on dedicated non shared channels.

In the case of analogue transmissions, the corresponding access protocol is known as the "radio-discipline" of the users.

Within the limits set out in this ETS, each group of users may use its own communication protocol.

## 2 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] prETS 300 113 (1995): "Radio Equipment and Systems (RES); Land mobile service; Technical characteristics and test conditions for radio equipment intended for the transmission of data (and speech) and having an antenna connector".
- [2] prETS 300 390 (1995): "Radio Equipment and Systems (RES); Land mobile service; Technical characteristics and test conditions for radio equipment intended for the transmission of data and speech and using an integral antenna".
- [3] I-ETS 300 113 (1992): "Radio Equipment and Systems (RES); Land mobile service Technical characteristics and test conditions for non-speech and combined analogue speech/non-speech equipment with an internal or external antenna connector, intended for the transmission of data".

### 3 Definitions

For the purpose of this ETS, the following definitions apply:

**bit:** Binary digit.

**block:** The smallest quantity of information sent over the radio channel. A constant number of useful bits are always sent together with the corresponding redundancy bits.

**packet:** One block or a contiguous stream of blocks sent by one (logical) transmitter to one particular receiver or one particular group of receivers.

**burst (physical):** Transmission of a small number of consecutive packets within a period not exceeding 300 ms in accordance with this access protocol.

**transmission (physical):** One or several packets transmitted between power on and power off of a particular transmitter.

**window:** A set of inter-related transmissions resulting from the action of the "initiating transmitter", and limited in time by the access protocol and corresponding occupation rules to a duration of  $t_t + \Delta t_t$ .

**session:** A set of inter-related exchanges of packets occupying one or several windows or parts thereof (if applicable). It corresponds to a complete interactive procedure for interchanging data between users, comprising initiation, data transmission and termination procedures. The session can be short (e.g. 2 packets) or long (e.g. one full page of text).

**message:** User data to be transferred in one or more packets in a session.

**initiating transmitter:** The initiating transmitter is the station that has completed the "observation time" (see subclause 6.5) and therefore starts a transmission. This initiates a window and triggers the timer  $t_t$ .

**reply:** A transmission by a station as an answer to the "initiating transmitter". This reply can be an acknowledge ("ACK") or a negative acknowledge ("NACK") or a longer packet of useful information.

### 4 General

#### 4.1 Sharing speech/data

This access protocol gives speech priority over data on mixed speech/data channels. In order to limit annoyance to speech users, the duration of data transmissions shall be limited in accordance with subclause 6.7.

#### 4.2 Sharing data/data

On frequencies assigned only to data communication users (without common central control facilities) the access protocol provides access to independent users with equal priority.

#### 4.3 Conformity to this ETS

A signed declaration shall be provided as a confirmation that the equipment meets the requirements of this access protocol. This may be submitted by the manufacturer with the application form for tests.

In the case where the controlling software for the equipment has not been engineered by the manufacturer of the radio equipment, the party responsible for engineering the controlling software shall provide a signed declaration that the equipment meets the requirements of this access protocol.

Measurements of receiver carrier sense delay and opening delay shall be performed in an accredited test laboratory, possibly together with the tests corresponding to ETS 300 113 [1].

#### 4.4 Interpretation of the measurement results

The interpretation of the results recorded in a test report for the measurements described in this ETS shall be as follows:

- a) the measured value related to the corresponding limit shall be used to decide whether an equipment meets the minimum requirements of this ETS;
- b) the actual measurement uncertainty of the test laboratory carrying out the measurement, for each particular measurement, shall be included in the test report;
- c) the values of the actual measurement uncertainty shall be, for each measurement, equal to or lower than the figures given in clause 9 (absolute measurement uncertainties).

### 5 Technical characteristics of the equipment

The timing requirements that the equipment shall fulfil in order to operate correctly and efficiently can be found in ETS 300 113 [1], subclauses 5.1.7 and 5.1.8, ETS 300 390 [2], subclauses 5.1.5 and 5.1.6 and subclauses 8.1.3 and 8.2.3 of this ETS.

The corresponding methods of measurement can be found in ETS 300 113 [1], subclauses 8.8 and 8.9, ETS 300 390 [2], subclauses 8.5 and 8.6 and in subclauses 8.1 and 8.2, of this ETS.

### 6 Access protocol

#### 6.1 General

The access protocol shall be used for each occupation of the Radio Frequency (RF) channel for sharing data/data and for sharing speech/data with automatic channel access.

#### 6.2 Principles

The equipment determines whether or not the channel is, and has been, idle for a certain period (the observation time) by means of carrier sensing.

The observation time consists of a fixed part and a randomly selected part. When the channel still appears to be idle at the end of the observation time, the transmitter is initiated and powered up within a specified time.

The duration of the emission is limited (see subclause 6.7).

#### 6.3 Procedure

The equipment shall determine whether or not the channel is, and has been, idle for a certain period (the observation time  $t_o$ ), by means of carrier sensing (see subclause 6.4). The observation time  $t_o$  consists of a fixed part  $t_f$  and a randomly selected part  $t_r$ .

If the channel is occupied during part of the observation time, the process shall be repeated (without changing  $m$  (see subclause 6.5)).

If the channel appears to be idle throughout the observation time, the transmitter shall be initiated and powered up within the specified time (attack time; see ETS 300 113 [1], subclause 8.8 or ETS 300 390 [2], subclause 8.5). The channel can then be seized for the duration of one time interval. The maximum length  $t_i$  of this interval depends on the frequency sharing category (data/speech, data/data).

If a re transmission is required (due, for example, to a "collision", i.e. a simultaneous channel access by several users), the observation process shall be repeated and the channel shall be detected as idle prior to a repetition of a transmission.