



SLOVENSKI STANDARD

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Terrestrial Trunked Radio (TETRA); Attachment requirements for TETRA terminal
equipment; Part 1: Civil access

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Candidate Harmonized European Standard (Telecommunications series)

Terrestrial Trunked Radio (TETRA); Attachment requirements for TETRA terminal equipment; Part 1: Civil access

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Foreword

This Candidate Harmonized European Standard (Telecommunications series) has been produced by ETSI Project Terrestrial Trunked Radio (TETRA).

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [19] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Directive 98/13/EC [15] of the European Parliament and of the Council relating to telecommunications terminal equipment and satellite earth station equipment, including the mutual recognition of their conformity ("Directive 98/13/EC [15]").

Technical specifications relevant to Directive 98/13/EC [15] are given in the requirements table in annex A.

The present document is part 1, of a multi-part EN covering the attachment requirements for TETRA terminal equipment, as identified below:

Part 1: "Civil access"; <https://standards.iteh.ai/catalog/standards/sist/81daff11-9594-4c98-bffe-bca8b972eacb/sist-en-301-435-1-v1-1-1-2004>

Part 2: "Emergency access".

National transposition dates

Date of adoption of this EN:	5 May 2000
Date of latest announcement of this EN (doa):	31 August 2000
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	28 February 2001
Date of withdrawal of any conflicting National Standard (dow):	28 February 2001

1 Scope

The present document specifies the technical characteristics to be provided by TERrestrial Trunked Radio (TETRA) terminal equipment, which uses the TETRA technology. It applies to terminal equipment operating within the frequency ranges, which are expected to be allocated to TETRA when member states have implemented ERC Decision ERC/DEC/(96)/4 [18].

The objective of the present document is to ensure that no disturbance occurs to the public telecommunications network, and to ensure proper inter-working of TETRA terminals with TETRA networks so that communication can be routed successfully through the applicable network(s).

The Harmonised Standard does not contain requirements on Direct Mode operation (DMO) (which means direct interworking between two mobiles without control or intervention by a network) unless control mechanisms to avoid interference are found.

In addition to the present document, other Harmonised Standards may apply.

Requirements apply to the network interface and the Radio Frequency (RF) Air Interface of the equipment.

TETRA terminal equipment consists of several elements. The present document is structured to enable the approval of the individual elements as separate items. Because of the need for effective use of the radio spectrum, the essential air interface characteristics will always apply. For each essential requirement a test is given including measurement methods.

In the present document there are no Electromagnetic Compatibility (EMC) requirements in terms of the Terminal Directive 98/13/EC [15], article 5c.

NOTE: Technical requirements for EMC performance are covered by the relevant standards applicable to the EMC Directive 89/336/EEC [17] which also lays down the conformity assessment procedure.

The present document is based on the radio and protocol provisions of ETS 300 392 and ETS 300 394.

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2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] ETSI ETS 300 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".
- [2] ETSI ETS 300 392-7: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 7: Security".
- [3] ETSI ETS 300 392-10: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1".
- [4] ETSI ETS 300 392-11: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary services stage 2".
- [5] ETSI ETS 300 392-12: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3".

- [6] ETSI ETS 300 392-14: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 14: Protocol Implementation Conformance Statement (PICS) proforma specification".
- [7] ETSI ETS 300 394-1: "Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 1: Radio".
- [8] ETSI ETS 300 394-2-1: "Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 2: Protocol testing specification for Voice plus Data (V+D); Sub-part 1: Test suite structure and test purposes".
- [9] ETSI ETS 300 394-2-2: "Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 2: Protocol testing specification for Voice plus Data (V+D); Sub-part 2: Abstract Test Suite (ATS) for Network (NWK) layer".
- [10] ETSI ETS 300 394-2-3: "Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 2: Protocol testing specification for Voice plus Data (V+D); Sub-part 3: Abstract Test Suite (ATS) for Logical Link Control (LLC)".
- [11] ETSI ETS 300 394-2-4: "Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 2: Protocol testing specification for Voice plus Data (V+D); Sub-part 4: Abstract Test Suite (ATS) for Medium Access Control (MAC)".
- [12] ETSI ETS 300 394-5-1: "Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 5: Security; Sub-part 1: Protocol Implementation Conformance Statement (PICS) proforma specification".
- [13] ETSI ETS 300 394-5-2: "Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 5: Security; Sub-part 2: Protocol testing specification for TETRA security".
- [14] ETSI ETS 300 394-5-3: "Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 5: Security; Sub-part 3: Abstract Test Suite (ATS)".
- [15] Directive 98/13/EC of the European Parliament and of the Council of 12 February 1998 relating to telecommunications terminal equipment and satellite earth station equipment, including the mutual recognition of their conformity.
- [16] ISO/IEC 9646-3 (1991): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The tree and tabular combined notation". (See also CCITT Recommendation X.292 (1992)).
- [17] Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility.
- [18] ERC Decision ERC/DEC/(96)04 of 7 March 1996 on the frequency bands for the introduction of the Trans European Trunked Radio System (TETRA).
- [19] Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETS 300 392-2 [1] apply.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

Um	TETRA Voice plus Data (V+D) air interface
Ud	TETRA Direct Mode (DM) air interface

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AACH	Access Assignment Channel
ACCH	Associated Control Channel
ATS	Abstract Test Suite
BLCH	Base station Linearisation channel
BNCH	Broadcast Network Channel
BS	Base Station
BSCH	Broadcast Synchronization Channel
BV	Behaviour valid
CA	Capability test
Cat.	Category
CC	Call Control
CCK	Common Cipher Key
CLCH	Common Linearisation Channel
CMCE	Circuit Mode Control Entity
CONP	Connection Oriented Network Protocol
CR	Cell Reselection
CTR	Common Technical Requirement
DM	Direct Mode
DMO	Direct Mode Operation
ETS	European Telecommunication Standard
FCS	Frame Check Sequence
GC	Group Call
GCK	Group Cipher Key
GSSI	Group Short Subscriber Identity
HD	Half-slot Down-link
HU	Half-slot Up-link
ITSI	Individual TETRA Subscriber Identity
IUT	Implementation Under Test
LLC	Logical Link Control
LS	Line Station
MA	MAintenance
MAC	Medium Access Control
MCCH	Main Control Channel
MCM	Minimum Control Mode
MLE	Mobile Link Entity
MM	Mobility Management
MS	Mobile Station
NCM	Normal Control Mode
NWK	Network layer
OTAR	On The Air Rekeying

PD	Permanent Disable
PDU	Protocol Data Unit
PEI	Peripheral Equipment Interface
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
RF	Radio Frequency
RT	Requirements Table
SCCH	Secondary Control Channel
SCH	Signalling Channel
SCK	Static Cipher Key
SCLNP	Specific Connectionless Network Protocol
SDU	Service Data Unit
SED	Secure Enable/Disable
SIM	Subscriber Identity Module
SS	Supplementary Service
STCH	Stealing Channel
SwMI	Switching and Management Infrastructure
TAR	Target
TCH	Traffic CHannel
TD	Tempory Disable
TEI	TETRA Equipment Identity
TETRA	Terrestrial Trunked Radio
TI	Timer
TM	TETRA MAC layer
TSS	Test Suite Structure
TP	Test Purpose
TTCN	Tree and Tabular Combined Notation
V+D	Voice and Data

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4 Requirements

This clause references the requirements from the standards specifying TETRA. It also contains the justifications for inclusion of the requirements, and a reference to the relevant test to verify compliance with the requirement.

NOTE: This clause does not specify the exact status (e.g. mandatory or optional) of the listed features, services and requirements. This is specified in the Requirements Tables (RT) in annex A.

4.1 Introduction

The following table headings are applicable to the tables in this clause:

Requirement reference: Reference to a (sub)clause(s) in the reference specification.

Description: A short description of the requirement.

Category (Cat.): The category in which the relative item falls under the article 5 in the Council Directive 98/13/EC [15].

The interpretation of category column in all tables is as follows:

- d** falls under item (d) from Article 5 of Council Directive 98/13/EC [15], "protection of the network from harm";
- e** falls under item (e) from Article 5 of Council Directive 98/13/EC [15], "effective use of radio frequency spectrum";
- f** falls under item (f) from Article 5 of Council Directive 98/13/EC [15], "interworking with the network";
- g** falls under item (g) from Article 5 of Council Directive 98/13/EC [15], "interworking via the network, in justified cases".

NOTE: There are no EMC technical requirements in the present document, which are specific to the equipment in terms of item (c) from Article 5 of Council Directive 98/13/EC [15]. Other technical aspects of EMC performance and testing of the equipment are covered by the relevant requirements of the EMC Directive, 89/336/EEC [17].

Justification: The justification for the requirement against the indicated category.

Test method reference: For physical layer tables, a test method is referenced for each requirement.

Test case limit value: For physical layer tables, the limit values are indicated for a requirement when applicable.

Test purpose reference: For protocol layer tables, at least one test purpose is referenced for each requirement.

Test case reference: For protocol layer tables, at least one test case is referenced for each requirement.

4.2 Requirements at the Um air interface

4.2.1 Physical layer requirements

This subclause contains the radio layer requirements at the Um air interface.

Table 1: Radio layer requirements at the Um air interface

Requirement reference (note 1)	Description	Cat.	Justification	Test case limit value reference (note 2)	Test method reference (note 3)
5.2	Modulation type.	d, e	Incorrect modulation type will lead to disturbance of other TETRA users.	-	Implicit by 10.1.3.
6.2	Frequency bands and channel arrangements.	d, e	Incorrect use of frequency bands and channel arrangements may cause unnecessary interference in the radio spectrum.	-	Implicit by 10.2.1/10.2.2
6.4.1.1	BS transmitter output power.	d, e	Maladjustment of the RF output power may either cause unnecessary interference in the radio spectrum or decrease the probability of successful radio connections.	7.1.1.2	8.1 and 8.1.2
6.4.1.2	MS transmitter output power.	d, e	Maladjustment of the RF output power may either cause unnecessary interference in the radio spectrum or decrease the probability of successful radio connections.	7.1.1.2	8.1 and 8.1.1
6.4.1.2	MS nominal transmitter output power control levels.	d, e	Maladjustment of the RF output power may either cause unnecessary interference in the radio spectrum or decrease the probability of successful radio connections.	7.1.1.2	8.1 and 8.1.1
6.4.2.2.1	Unwanted conducted emission over the useful part of the burst.	d, e	Unwanted emissions above an acceptable level may cause unnecessary interference in the radio spectrum.	7.1.3.2	8.3
6.4.2.2.2	Unwanted conducted emission during the switching transients.	d, e	Unwanted emissions above an acceptable level may cause unnecessary interference in the radio spectrum.	7.1.4.2	8.4
6.4.2.3	Unwanted conducted emission far from the carrier.	d, e	Unwanted emissions above an acceptable level may cause unnecessary interference in the radio spectrum.	7.1.5.2	8.5
6.4.2.4	Unwanted conducted emission during CLCH and BLCH.	d, e	Unwanted emissions above an acceptable level may cause unnecessary interference in the radio spectrum.	7.1.7.2	8.7, 8.7.1 and 8.7.2
6.4.2.5	Unwanted conducted emission in the non-transmit state.	d, e	Unwanted emissions above an acceptable level may cause unnecessary interference in the radio spectrum.	7.2.8.2	9.8
6.4.3	Unwanted radiated emissions.	d, e	Unwanted emissions above an acceptable level may cause unnecessary interference in the radio spectrum.	7.1.6.2	8.6
6.4.5	BS output power time mask.	e	A violation of the given RF power time mask may lead to unnecessary interference in the radio spectrum.	7.1.1.2	8.1 and 8.1.2
6.4.5	MS output power time mask.	e	A violation of the given RF power time mask may lead to unnecessary interference in the radio spectrum.	7.1.1.2	8.1 and 8.1.1
6.4.5.1	BS output power in non-active transmit state.	e	A violation of the given RF power time mask may lead to unnecessary interference in the radio spectrum.	7.1.2.2	8.2
6.4.5.2	MS output power in non-active transmit state.	e	A violation of the given RF power time mask may lead to unnecessary interference in the radio spectrum.	7.1.2.2	8.2
6.4.6.2	BS transmitter intermodulation attenuation.	d, e	A transmitter intermodulation attenuation below an acceptable level may cause unnecessary interference in the radio spectrum.	7.1.8.2.2	8.8 and 8.8.2
6.4.6.3	MS transmitter intermodulation attenuation.	d, e	A transmitter intermodulation attenuation below an acceptable level may cause unnecessary interference in the radio spectrum.	7.1.8.2.1	8.8 and 8.8.1
6.4.7	Intra-BS transmitter intermodulation attenuation.	d, e	A transmitter Intra-BS intermodulation attenuation below an acceptable level may cause unnecessary interference in the radio spectrum.	7.1.8.2.3	8.8 and 8.8.3

Requirement reference (note 1)	Description	Cat.	Justification	Test case limit value reference (note 2)	Test method reference (note 3)
6.5.1.2	Blocking characteristics.	e	Insufficient blocking characteristics of the receiver may lead to an unnecessarily high number of radio transmission attempts.	7.2.5.2	9.5, 9.5.1 and 9.5.2
6.5.2.2	Spurious response rejection.	d, e	Insufficient spurious response rejection may lead to an unnecessarily high number of radio transmission attempts.	7.2.6.2	9.6
6.5.3.2	Intermodulation response rejection.	d, e	Insufficient intermodulation response rejection may lead to an unnecessarily high number of radio transmission attempts.	7.2.7.2	9.7, 9.7.1 and 9.7.2
6.5.4.2	Unwanted conducted emission in reception.	d, e	Unwanted emissions above an acceptable level may cause unnecessary interference in the radio spectrum.	7.2.8.2	9.8
6.5.5	Unwanted radiated emission.	d, e	Unwanted emissions above an acceptable level may cause unnecessary interference in the radio spectrum.	7.2.9.2	9.9
6.6.1.2	Modulation accuracy.	e, f	Insufficient modulation accuracy may lead to the transmission of incorrect data.	7.3.1.2	10.1, 10.1.1, 10.1.2 and 10.1.3
6.6.2.1	Nominal error rate.	e, f	An unacceptable nominal error rate may lead to the reception of incorrect data.	7.2.2.2	9.2, 9.2.1 and 9.2.2
6.6.2.2	Dynamic reference sensitivity performance.	e, f	An unacceptable dynamic reference sensitivity performance may lead to the reception of incorrect data.	7.2.3.2	9.3, 9.3.1, 9.3.2 and 9.3.3
6.6.2.2.1	BS dynamic reference sensitivity performance.	e, f	An unacceptable dynamic reference sensitivity performance may lead to the reception of incorrect data.	7.2.3.2	9.3 and 9.3.2
6.6.2.2.2	MS dynamic reference sensitivity performance.	e, f	An unacceptable dynamic reference sensitivity performance may lead to the reception of incorrect data.	7.2.3.2	9.3 and 9.3.1
6.6.2.3	Reference interference performance.	e, f	An unacceptable reference interference performance may lead to the reception of incorrect data.	7.2.4.2	9.4, 9.4.1 and 9.4.2
6.6.2.3.1	BS reference interference performance.	e, f	An unacceptable reference interference performance may lead to the reception of incorrect data.	7.2.4.2	9.4 and 9.4.2
6.6.2.3.2	MS reference interference performance.	e, f	An unacceptable reference interference performance may lead to the reception of incorrect data.	7.2.4.2	9.4 and 9.4.1
6.6.2.4	Static reference sensitivity performance.	e, f	An unacceptable static reference sensitivity performance may lead to the reception of incorrect data.	Implicit by 7.2.5.2, 7.2.6.2 and 7.2.7.2	Implicit by 9.5.1, 9.5.2, 9.6, 9.7.1 and 9.7.2.
6.6.2.4.1	BS static reference sensitivity performance.	e, f	An unacceptable static reference sensitivity performance may lead to the reception of incorrect data.	Implicit by 7.2.5.2, 7.2.6.2 and 7.2.7.2	Implicit by 9.5.2, 9.6, and 9.7.2.
6.6.2.4.2	MS static reference sensitivity performance.	e, f	An unacceptable static reference sensitivity performance may lead to the reception of incorrect data.	Implicit by 7.2.5.2, 7.2.6.2 and 7.2.7.2	Implicit by 9.5.1, 9.6 and 9.7.1.
6.6.2.5	MS receiver performance for synchronization burst acquisition.	d, e	An insufficient synchronization burst acquisition may cause unnecessary interference in the radio spectrum.	-	Implicit by MAC layer testing.
7.4	Timing of transmitted signal.	d, e	An insufficient synchronization may cause unnecessary interference in the radio spectrum.	-	Implicit by MAC layer testing.
7.5	BS requirement for synchronization.	d, e	An insufficient synchronization may cause unnecessary interference in the radio spectrum.	7.3.2.2	10.2 and 10.2.2
7.6	MS requirement for synchronization.	d, e	An insufficient synchronization may cause unnecessary interference in the radio spectrum.	7.3.2.2 and 7.3.4.2	10.2, 10.2.1 and 10.4
9.5.2	Mapping of BCCH and CLCH.	d, e	Incorrect mapping of BCCH and CLCH may cause interference with other users.	-	Implicit by MAC layer testing.

Requirement reference (note 1)	Description	Cat.	Justification	Test case limit value reference (note 2)	Test method reference (note 3)
9.5.3	Mapping of SCH.	d, e	Incorrect mapping of SCH may cause interference with other users.	-	Implicit by MAC layer testing.
9.5.4	Mapping of TCH and STCH.	d, e	Incorrect mapping of TCH and STCH may cause interference with other users.	-	Implicit by CMCE layer testing.
9.5.5	Mapping of AACH.	d, e	Incorrect mapping of AACH may cause interference with other users.	-	Implicit by MAC layer testing.
10.2	RF power control.	d, e, f	An insufficient RF power control may either cause unnecessary interference in the radio spectrum or decrease the probability of successful radio connections.	7.3.5.2	10.5
10.3.1	Received signal strength.	d, e, f	If the received signal strength is not measured sufficiently accurate this may lead to a maladjustment of the RF output power and thus either cause unnecessary interference in the radio spectrum or decrease the probability of successful radio connections.	7.3.5.2	10.5
23.4.4.2	MS open loop power control.	d, e, f	An insufficient RF power control may either cause unnecessary interference in the radio spectrum or decrease the probability of successful radio connections.	7.3.5.2	10.5
F.2	TETRA Frequency bands.	d, e	Incorrect use of frequency bands may cause unnecessary interference in the radio spectrum.	-	Implicit by 10.2.1/10.2.2
F.3	Duplex spacing	d, e	Incorrect Duplex spacing may cause unnecessary interference in the radio spectrum.	-	Implicit by 10.2.1/10.2.2
ETS 300 394-1 [7], subclause 6.2.2	Extreme ambient temperatures.	d, e, f	Equipment, which is not supposed to operate in a controlled environment, may cause unnecessary interference in the radio spectrum, if the requirements to output power, adjacent channel power and reference sensitivity are not fulfilled at extreme temperatures.	-	Implicit by test of output power, adjacent channel power and reference sensitivity.
NOTE 1: The requirements are specified in ETS 300 392-2 [1] under the given subclause, except when otherwise stated.					
NOTE 2: The test case limit values are specified in ETS 300 394-1 [7], clause 7.					
NOTE 3: The test methods are specified in ETS 300 394-1 [7], clauses 8 to 10.					

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