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Prizemni snopovni radio (TETRA) - Dostop v sili

Terrestrial Trunked Radio (TETRA); Emergency access

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Foreword

This Technical Basis for Regulation (TBR) has been produced by the ETSI Project Terrestrial Trunked Radio (TETRA) of the European Telecommunications Standards Institute (ETSI).

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1 Scope

This TBR specifies the technical characteristics to be provided by Terrestrial Trunked Radio (TETRA) terminal equipment which is capable of connecting and inter-working with a public telecommunications network and which uses the TETRA technology. It applies only to terminal equipment intended for police and emergency services operating within European harmonised frequency bands in the range 380 MHz to 383 MHz and 390 MHz to 393 MHz.

NOTE 1: These frequency bands may be extended by an additional 2 MHz at a later time.

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

The requirements in this TBR apply together with the attachment requirements for the appropriate public telecommunications network and the requirements of any other applicable TBR. It does not add to, or reduce, the attachment requirements unless there is a particular effect on the network which is unique to TETRA.

NOTE 2: Appropriate public telecommunications network refers to the TBR for basic rate Integrated Services Digital Network (ISDN), the TBR for primary rate ISDN or the national regulations (implementing ETS 300 001) for Public Switched Telecommunications Network.

TETRA terminal equipment consists of several elements. This TBR is structured to allow testing and approval of the individual elements as separate items. Due to the need for effective use of the radio spectrum, the essential air interface characteristics have to be tested. For each essential requirement a test is given including measurement methods.

Requirements apply to the public network interface and the Radio Frequency (RF) interface of the equipment, which may be stimulated to perform the tests by additional equipment.

In this TBR there are no additional Electromagnetic Compatibility (EMC) requirements in terms of the Terminal Directive 91/263/EEC [13], article 4c.

NOTE 3: Technical requirements for EMC performance and testing of the equipment are covered by the relevant standards applicable to the EMC Directive 89/336/EEC.

Terminal equipment may be subject to additional requirements in other applicable Common Technical Requirements (CTRs), or European Directives depending on the functionality (i.e. primary functions).

2 Normative references

This TBR incorporates, by dated or 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 TBR only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ETS 300 392-2 (March 1996): "Radio Equipment and Systems (RES); Trans-European Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air interface".
- [2] ETS 300 392-10: "Trans-European Trunked Radio (TETRA); Voice plus Data (V+D); Voice plus Data (V+D); Part 10: Supplementary services stage 1".
- [3] ETS 300 392-11: "Radio Equipment and Systems (RES); Trans-European Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary Services (SS) stage 2".

- [4] ETS 300 392-12: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary Services (SS) stage 3".
- [5] ETS 300 392-14: "Radio Equipment and Systems (RES); Trans-European Trunked Radio (TETRA); Voice plus Data (V+D); Part 14: Protocol Implementation Conformance Statement (PICS) proforma specification".
- [6] ETS 300 394-1 (March 1996): "Radio Equipment and Systems (RES); Trans-European Trunked Radio (TETRA); Conformance testing specification; Part 1: Radio".
- [7] 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".
- [8] 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".
- [9] 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)".
- [10] 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)".
- [11] ETS 300 395-2 (December 1996): "Radio Equipment and Systems (RES); Trans-European Trunked Radio (TETRA); Speech codec for full-rate traffic channel; Part 2: TETRA codec".
- [12] ETS 300 395-4 (February 1997): "Radio Equipment and Systems (RES); Trans-European Trunked Radio (TETRA); Speech codec for full-rate traffic channel; Part 4: Codec conformance testing".
- [13] Council Directive 91/263/EEC of 29 April 1991 on the approximation of the laws of the Member States concerning telecommunications terminal equipment, including the mutual recognition of their conformity.
- [14] Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility.
- [15] 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)).

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of this TBR, the definitions given in ETS 300 392-2 [1] apply.

3.2 Symbols

For the purposes of this TBR, 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 this TBR, the following abbreviations apply:

AACH	Access Assignment Channel
ATS	Abstract Test Suite
BNCH	Broadcast Network Channel
BS	Base Station
BSCH	Broadcast Synchronization Channel
Cat.	Category
CC	Call Control
CMCE	Circuit Mode Control Entity
CONP	Connection Oriented Network Protocol
CRC	Cyclic Redundancy Check
CTR	Common Technical Requirement
ETS	European Telecommunication Standard
FCS	Frame Check Sequence
ITSI	Individual TETRA Subscriber Identity
IUT	Implementation Under Test
LLC	Logical Link Control
LS	Line Station
MAC	Medium Access Control
MCCH	Main Control Channel
MCM	Minimum Control Mode
MM	Mobility Management
MS	Mobile Station
NCM	Normal Control Mode
PC	Protocol Control
PDU	Protocol Data Unit
PEI	Peripheral Equipment Interface
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
PUEM	Probability of Undetected Erroneous Message
RCPC	Rate-Compatible Punctured Convolutional
RT	Requirements Table
SCCH	Secondary Control Channel
SCH	Signalling Channel
SCLNP	Specific Connectionless Network Protocol
SDS	Short Data Services
SDU	Service Data Unit
SIM	Subscriber Identity Module
SS	Supplementary Service
STCH	Stealing Channel
SwMI	Switching and Management Infrastructure
TBR	Technical Basis for Regulation
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 TBR Requirements Tables (TBR-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 4 in the Council Directive 91/263/EEC [13].

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

d falls under item (d) from Article 4 of Council Directive 91/263/EEC [13], "protection of the network from harm";

e falls under item (e) from Article 4 of Council Directive 91/263/EEC [13], "effective use of radio frequency spectrum";

f falls under item (f) from Article 4 of Council Directive 91/263/EEC [13], "interworking with the network";

g falls under item (g) from Article 4 of Council Directive 91/263/EEC [13], "interworking via the network, in justified cases".

NOTE: There are no EMC technical requirements in this TBR, which are specific to the equipment in terms of item (c) from Article 4 of Council Directive 91/263/EEC [23]. Other technical aspects of EMC performance and testing of the equipment are covered by the relevant requirements of the EMC Directive, 89/336/EEC [14].

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

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

Test case limit value: For physical layer and codec 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.	TBR justification	Test case limit value reference (note 2)	Test method reference (note 3)
4.7	Modulation.	d, e	Incorrect modulation will lead to disturbance of other TETRA users.	-	Implicit by 10.1.3.
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	8.1.2
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	8.1.1
6.4.1.2	MS 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.	7.3.5.2	10.5
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
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	8.1.2

(continued)

Table 1 (continued): Radio layer requirements at the Um air interface

Requirement reference (note 1)	Description	Cat.	TBR justification	Test case limit value reference (note 2)	Test method reference (note 3)
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	8.1.1 and 10.5
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 intermodulation attenuation.	d, e	An 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 intermodulation attenuation.	d, e	An 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 intermodulation attenuation.	d, e	An 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
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	9.5.1 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	9.7.1 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	9.8
6.6.1.2	Modulation accuracy.	e, f	Insufficient modulation accuracy may lead to the transmission of incorrect data.	7.3.1.2	10.1.1, 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	9.2.1 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	9.3.1, 9.3.2 and 9.3.3

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Table 1 (continued): Radio layer requirements at the Um air interface

Requirement reference (note 1)	Description	Cat.	TBR justification	Test case limit value reference (note 2)	Test method reference (note 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	9.3.2
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	9.3.1
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	9.4.1 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	9.4.2
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	9.4.1
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 synchronisation burst acquisition.	d, e	An insufficient synchronisation 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 synchronisation may cause unnecessary interference in the radio spectrum.	-	Implicit by MAC layer testing.
7.5	BS requirement for synchronisation.	d, e	An insufficient synchronisation may cause unnecessary interference in the radio spectrum.	7.3.2.2	10.2.2
7.6	MS requirement for synchronisation.	d, e	An insufficient synchronisation may cause unnecessary interference in the radio spectrum.	7.3.2.2 and 7.3.4.2	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.
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.
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