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Terrestrial Trunked Radio (TETRA); Conformance testing specification; Part 1: Radio

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Foreword

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The present document contains text concerning conformance testing of the equipment to which it relates. This text should be considered only as guidance and does not make the present document mandatory.

The present document is part 1 of a multi-part deliverable covering the conformance testing specification, as identified below:

Part 1: "Radio";

Part 2: "Protocol testing specification for Voice plus Data (V+D)";

Part 4: "Protocol testing specification for Direct Mode Operation (DMO)";

Part 5: "Security".

NOTE: Part 2, part 4 and part 5 of this multi-part deliverable are in status "historical" and are not maintained.

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Modal verbs terminology

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Introduction

The present document includes Direct Access and multislot receiver testing in addition to the earlier Release 2 tests and is aligned with ETSI EN 300 392-2 [1].

1 Scope

The present document specifies the minimum technical characteristics of TETRA Voice plus Data (V+D) Base Stations (BS) and Mobile Station (MS) equipment, and TETRA Direct Mode Operation (DMO) equipment, and the radio test methods used for type testing. Specific test methods for DMO equipment are defined in annex F of the present document. The purpose of these specifications is to provide a sufficient quality of radio transmission and reception for equipment operating in a TETRA system and to minimize harmful interference to other equipment. The present document is applicable to TETRA systems operating at radio frequencies in the range of 300 MHz to 1 GHz.

These specifications do not necessarily include all the characteristics which may be required by a user of equipment, nor do they necessarily represent the optimum performance achievable.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

- [1] ETSI EN 300 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)" / ETSI TS 100 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".

NOTE: The references EN 300 392-2 and TS 100 392-2 are two instances of the same document and the latest version of those is used as the normative reference. For a shorter presentation only EN 300 392-2 [1] is used as the reference in the present document.

- [2] Recommendation ITU-T O.153: "Basic parameters for the measurement of error performance at bit rates below the primary rate".
- [3] ETSI EN 300 113-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Land mobile service; Radio equipment intended for the transmission of data (and/or speech) using constant or non-constant envelope modulation and having an antenna connector; Part 1: Technical characteristics and methods of measurement".
- [4] Recommendation ITU-T V.1: "Equivalence between binary notation symbols and the significant conditions of a two-condition code".
- [5] ISO 2110:1989: "Information technology - Data communication - 25-pole DTE/DCE interface connector and contact number assignments".
- [6] ETSI EN 300 395-4: "Terrestrial Trunked Radio (TETRA); Speech codec for full-rate traffic channel; Part 4: Codec conformance testing".
- [7] ETSI EN 300 396-2: "Terrestrial Trunked Radio (TETRA); Technical requirements for Direct Mode Operation (DMO); Part 2: Radio aspects".
- [8] ETSI EN 300 392-1: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General Network Design".
- [9] ETSI EN 300 392-7: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 7: Security".

- [10] ETSI ETS 300 392-11-22: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary services stage 2; Sub-part 22: Dynamic Group Number Assignment (DGNA)".
- [11] ETSI EN 300 392-12-22: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 22: Dynamic Group Number Assignment (DGNA)".
- [12] ETSI EN 300 395-2: "Terrestrial Trunked Radio (TETRA); Speech codec for full-rate traffic channel; Part 2: TETRA codec".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] ETSI ETR 028: "Radio Equipment and Systems (RES); Uncertainties in the measurement of mobile radio equipment characteristics".
- [i.2] ETSI EN 300 396-1: "Terrestrial Trunked Radio (TETRA); Technical requirements for Direct Mode Operation (DMO); Part 1: General network design".
- [i.3] ETSI TS 101 293: "Digital cellular telecommunications system (Phase 2+); Individual equipment type requirements and interworking; Special conformance testing functions (3GPP TS 04.14)".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI EN 300 392-2 [1] and the following apply:

accreditation body: body that conducts and administers a laboratory accreditation system and grants accreditation

accredited laboratory: testing laboratory to which accreditation has been granted

receive band of the equipment: maximum frequency range (declared by the manufacturer) over which the receiver can be operated without reprogramming or realignment

testing laboratory: laboratory that performs tests

transmit band of the equipment: maximum frequency range (declared by the manufacturer) over which the transmitter can be operated without reprogramming or realignment

3.2 Symbols

For the purposes of the present document, the symbols given in ETSI EN 300 392-2 [1] and the following apply:

f_{lo}	local oscillator frequency applied to first receiver mixer
$if_1 \dots if_n$	receiver intermediate frequencies
P_{MS}	access power
E	Stop bit
Message	Information on layer 3

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI EN 300 392-2 [1] and the following apply:

AI	Air Interface
B	measurement Bandwidth
BFI	Bad Frame Indication
C/I	Carrier to Interference ratio
C/Ia	Carrier to Interference ratio for adjacent channel
C/Ic	Carrier to Interference ratio for co-channel
CA MS	Conventional Access Mobile Station
CRC	Cyclic Redundancy Check
DA MS	Direct Access Mobile Station
dBc	decibels relative to carrier power
dBm	decibels relative to one mW
DM-GATE	Direct Mode operation - GATEway
DM-MS	Direct Mode - Mobile Station
DMO	Direct Mode Operation
DM-REP	Direct Mode - REPeater
DM-REP/GATE	Direct Mode - REPeater/GATEway
DO-MS	Direct mode Only Mobile Station
DU-MS	DUAl mode Mobile Station
DW-MS	Dual Watch - Mobile Station
ETX	End of data
Frame	Used on layer 2 to transfer messages to and from layer 3
HTHV	High Temperature High Voltage
IUT	Implementation Under Test
LTHV	Low Temperature High Voltage
LTLV	Low Temperature Low Voltage
LTT-SAP	Service Access Point for TT entity to access Mobile Link Entity (MLE)
MI	Message Identifier
PRBS	Pseudo Random Bit Sequence
RSSI	Received Signal Strength Indicator
Rx	Receiver
S	Start bit
SCH/F	Signalling CHannel Full
ST	Status indicator
STX	Start of data
TD	Timing Delay
TEI	TETRA Equipment Identity
TSS	TETRA System Simulator
TT	TETRA Test
TTCI	TETRA Test Connector Interface
T-TEST	Layer 3 timer (30s) for confirmation of setting of TETRA Test mode
Tx	Transmitter
V+D	Voice plus Data

4 General

4.1 Presentation of equipment for testing purposes

Each equipment submitted for type testing shall fulfil the requirements of the present document on all channels over which it is intended to operate. The manufacturer, or other applicant, shall provide one or more production model(s) of the equipment, as appropriate, for type testing. If type approval is given on the basis of tests on pre-production models, those models shall be manufactured in accordance with the same production drawings and manufacturers specifications as the later production models. This fact shall be declared by the manufacturer in the application form. For more details refer to ETSI EN 300 113-1 [3].