



SLOVENSKI STANDARD
DSIST ETS 300 176-1:199,
01-XYWVa VYf-199,

8][]HJbY]nVc`ýUbYVfYnj fj] bYHfY_ca i b]_UWY'fB 97 HL!'GdYWZ_ UWYU
cXcVf]hj YbY[UdfYg_i gU!'%'XY.'FUX]c

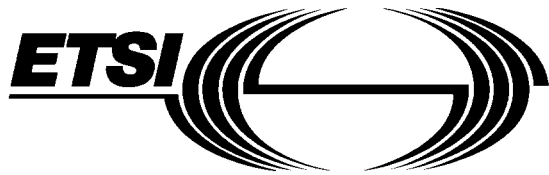
Digital Enhanced Cordless Telecommunications (DECT); Approval test specification;
Part 1: Radio

Ta slovenski standard je istoveten z: ETS 300 176-1 E2.% - *!%%

ICS:

33.070.30 Öã äæ) ^/á à[|zæ) ^ Digital Enhanced Cordless
à!^: ç!çã} ^/á ^\ [{ ~ } ä æä Telecommunications (DECT)
CÖÓÓVD

DSIST ETS 300 176-1:199, en



EUROPEAN
TELECOMMUNICATION
STANDARD

ETS 300 176-1

November 1996

Second Edition

Source: ETSI TC-RES

Reference: RE/RES-03028-1

ICS: 33.020, 33.060.50

Key words: DECT, radio, testing, type approval

**Radio Equipment and Systems (RES);
Digital Enhanced Cordless Telecommunications (DECT);
Approval test specification;
Part 1: Radio**

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 4 92 94 42 00 - Fax: +33 4 93 65 47 16

Copyright Notification: No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 1996. All rights reserved.

Contents

| | |
|---|----|
| Foreword | 9 |
| 1 Scope | 11 |
| 2 Normative references | 12 |
| 3 Definitions and abbreviations | 13 |
| 3.1 Definitions | 13 |
| 3.2 Abbreviations | 15 |
| 4 General | 16 |
| 4.1 Document layout | 16 |
| 4.1.1 Test suites | 16 |
| 4.1.2 Test groups | 16 |
| 4.1.3 Test cases | 17 |
| 4.2 Presentation of equipment for testing purposes | 17 |
| 4.2.1 Choice of model for type examination | 17 |
| 4.2.2 Description of equipment | 18 |
| 4.2.2.1 Protocol Implementation Conformance Statement (PICS) .. | 18 |
| 4.2.2.2 Protocol Implementation eXtra Information for Testing (PIXIT) | 18 |
| 4.2.2.3 Environmental test conditions | 18 |
| 4.2.3 Host connected equipment | 18 |
| 4.2.4 Applicant's declaration | 18 |
| 4.3 Applicability of type tests | 18 |
| 4.3.1 Equipment that includes only a DECT RF receiver | 18 |
| 4.3.2 Equipment that includes a radio transmitter | 19 |
| 4.3.3 Equipment that is equipped with an analogue port | 19 |
| 4.3.4 Equipment with a synchronization port | 19 |
| 4.3.5 Equipment incorporating the IPEI (PPs only) | 19 |
| 4.3.6 All FP equipment | 19 |
| 4.3.7 PPs with direct PP to PP communication option | 19 |
| 4.3.8 Installation related issues | 19 |
| 4.3.9 Wireless relay stations | 19 |
| 4.4 Interpretation of the measurement results | 20 |
| 5 General test requirements | 20 |
| 5.1 Test philosophy | 20 |
| 5.2 Test site | 21 |
| 5.2.1 Open air test site | 21 |
| 5.2.1.1 Description | 21 |
| 5.2.1.2 Calibration | 22 |
| 5.2.2 Anechoic chamber | 23 |
| 5.2.2.1 General | 23 |
| 5.2.2.2 Description | 23 |
| 5.2.2.3 Influence of parasitic reflections | 25 |
| 5.2.2.4 Calibration and mode of use | 25 |
| 5.2.3 Stripline coupler | 25 |
| 5.2.3.1 Description | 25 |
| 5.2.3.2 Calibration | 25 |
| 5.2.3.3 Mode of use | 26 |
| 5.3 Standard position | 26 |
| 5.4 Test antenna of the LT | 26 |
| 5.5 Substitution antenna | 26 |
| 5.6 Test fixture | 27 |
| 5.6.1 Description | 27 |
| 5.6.1.1 Calibration of the test fixture for the measurement of transmitter characteristics | 27 |

| | | | |
|------|----------|---|----|
| | 5.6.1.2 | Calibration of the test fixture for the measurement of receiver characteristics | 28 |
| | 5.6.1.3 | Mode of use | 28 |
| | 5.6.2 | Equipment with a temporary or internal permanent antenna connector | 29 |
| | 5.6.2.1 | Equipment with a temporary antenna connector | 29 |
| 5.7 | | Indoor test site | 29 |
| | 5.7.1 | Description | 29 |
| | 5.7.2 | Test for parasitic reflections | 30 |
| | 5.7.3 | Calibration and mode of use | 30 |
| 5.8 | | Lower Tester (LT) | 31 |
| | 5.8.1 | Description | 31 |
| | 5.8.2 | Connections between the EUT and the LT | 31 |
| | 5.8.3 | Functions and abilities | 32 |
| | 5.8.4 | Signal generation uncertainty | 32 |
| | 5.8.4.1 | Modulated DECT-like carrier | 32 |
| | 5.8.4.2 | CW interferers | 32 |
| | 5.8.4.3 | DECT RF Signal | 32 |
| | 5.8.4.4 | Test modulation signals | 32 |
| | 5.8.5 | Measurement uncertainty | 33 |
| 5.9 | | Upper Tester (UT) | 33 |
| | 5.9.1 | Description of the UT | 33 |
| | 5.9.2 | The test standby mode | 33 |
| | 5.9.3 | Test messages | 34 |
| 5.10 | | Description of the lower tester FT and PT | 34 |
| 5.11 | | General test methods | 34 |
| | 5.11.1 | General | 34 |
| | 5.11.2 | Sampling the RF signal | 35 |
| | 5.11.2.1 | Introduction | 35 |
| | 5.11.2.2 | Sampling method | 35 |
| | 5.11.3 | Determining the reference position | 35 |
| | 5.11.3.1 | Case 1: EUTs that cannot transmit | 35 |
| | 5.11.3.2 | Case 2: EUTs that can transmit | 35 |
| | 5.11.4 | Bit error rate (BER) measurements | 35 |
| 5.12 | | Test setup | 36 |
| | 5.12.1 | Test setup 1 | 36 |
| | 5.12.2 | Test setup 2 | 36 |
| | 5.12.3 | Test setup 3 | 37 |
| | 5.12.4 | Test setup 4 | 37 |
| | 5.12.5 | Test setup 5 | 38 |
| 5.13 | | Test arrangements for intermodulation measurements | 38 |
| | 5.13.1 | PT to PT arrangement | 38 |
| | 5.13.2 | FT to FT arrangement | 39 |
| | 5.13.3 | FT to PT arrangement | 39 |
| 6 | | Test conditions, power sources and ambient temperatures | 40 |
| | 6.1 | General | 40 |
| | 6.2 | Nominal test conditions | 40 |
| | 6.3 | Extreme test conditions | 41 |
| | 6.4 | Test power source - general requirements | 42 |
| | 6.5 | Nominal test power source | 42 |
| | 6.5.1 | Mains voltage | 42 |
| | 6.5.2 | Regulated lead acid battery power sources | 42 |
| | 6.5.3 | Nickel cadmium battery | 42 |
| | 6.5.4 | Other power sources | 42 |
| | 6.6 | Extreme test power source | 42 |
| | 6.6.1 | Mains voltage | 42 |
| | 6.6.2 | Regulated lead acid battery power sources | 42 |
| | 6.6.3 | Nickel cadmium battery | 42 |
| | 6.6.4 | Other power sources | 43 |
| | 6.7 | Testing of host connected equipment and plug-in cards | 43 |
| | 6.7.1 | Alternative A: composite equipment | 43 |
| | 6.7.2 | Alternative B: use of a test jig and three hosts | 43 |

| | | |
|------|--|----|
| 7 | Accuracy and stability of RF carriers..... | 44 |
| 7.1 | Definition | 44 |
| 7.2 | Test environment..... | 44 |
| 7.3 | Method of measurement..... | 44 |
| 7.4 | Verdict criteria when the EUT is a RFP | 45 |
| 7.5 | Verdict criteria when the EUT is a PP..... | 45 |
| | 7.5.1 Case 1: When the measurement is made during the first 1 s of the EUT going into a transmit mode from a non-transmitting mode..... | 45 |
| | 7.5.2 Case 2: When the measurement is made at any other time..... | 45 |
| 8 | Accuracy and stability of timing parameters..... | 45 |
| 8.1 | Slot structure definitions..... | 45 |
| 8.2 | Definition of the position of p0..... | 46 |
| 8.3 | Measurement of packet timing jitter..... | 46 |
| | 8.3.1 Test environment..... | 46 |
| | 8.3.2 Method of measurement | 47 |
| | 8.3.3 Verdict criteria | 47 |
| 8.4 | Measurement of the reference timing accuracy of a RFP | 47 |
| | 8.4.1 Test environment..... | 47 |
| | 8.4.2 Method of measurement | 47 |
| | 8.4.3 Verdict criteria | 48 |
| 8.5 | Measurement of packet transmission accuracy of a PP..... | 48 |
| | 8.5.1 Test environment..... | 48 |
| | 8.5.2 Method of measurement | 48 |
| | 8.5.3 Verdict criteria | 49 |
| 9 | Transmission burst..... | 49 |
| 9.1 | Definitions | 49 |
| | 9.1.1 Physical packets..... | 49 |
| | 9.1.2 Transmitted power..... | 49 |
| | 9.1.3 Normal Transmitted Power (NTP)..... | 49 |
| | 9.1.4 Transmitter attack time..... | 49 |
| | 9.1.5 Transmitter release time | 49 |
| | 9.1.6 Minimum power..... | 49 |
| | 9.1.7 Maximum power | 50 |
| | 9.1.8 Maintenance of transmission after packet end..... | 50 |
| | 9.1.9 Transmitter idle power output..... | 50 |
| 9.2 | Test environment | 50 |
| 9.3 | Method of measurement..... | 50 |
| 9.4 | Verdict criteria | 51 |
| 10 | Transmitted power | 51 |
| 10.1 | Definitions | 51 |
| | 10.1.1 PP and RFP with an integral antenna | 51 |
| | 10.1.2 PP and RFP with external connections for all antennas | 51 |
| | 10.1.3 PP and RFP with both integral and external antennas..... | 52 |
| 10.2 | PP and RFP with an integral antenna | 52 |
| | 10.2.1 Test environment..... | 52 |
| | 10.2.2 Method of measurement | 52 |
| | 10.2.2.1 Measurement of NTP | 52 |
| | 10.2.2.2 Measurement of antenna gain..... | 53 |
| | 10.2.3 Verdict criteria for all EUTs..... | 53 |
| 10.3 | PP and RFP with external antenna connection(s) | 54 |
| | 10.3.1 Test environment..... | 54 |
| | 10.3.2 Method of measurement | 54 |
| | 10.3.3 Verdict criteria for all EUTs..... | 54 |
| 11 | RF carrier modulation..... | 54 |
| 11.1 | Test environment | 54 |
| 11.2 | Method of measurement, Parts 1 and 2 | 55 |
| | 11.2.1 Part 1 | 55 |
| | 11.2.2 Part 2..... | 55 |
| 11.3 | Method of measurement, Parts 3 and 4 | 56 |

| | | | |
|------|--------|---|----|
| | 11.3.1 | Part 3 | 56 |
| | 11.3.2 | Part 4 | 56 |
| 11.4 | | Verdict criteria for Part 1 | 56 |
| 11.5 | | Verdict criteria for Part 2 | 56 |
| 11.6 | | Verdict criteria for Part 3 | 56 |
| 11.7 | | Verdict criteria for Part 4 | 57 |
| 12 | | Unwanted RF power radiation | 58 |
| 12.1 | | General test conditions..... | 58 |
| 12.2 | | Emissions due to modulation | 58 |
| | 12.2.1 | Definition..... | 58 |
| | 12.2.2 | Test environment..... | 58 |
| | 12.2.3 | Method of measurement..... | 59 |
| | 12.2.4 | Verdict criteria..... | 59 |
| 12.3 | | Emissions due to transmitter transients | 60 |
| | 12.3.1 | Definition..... | 60 |
| | 12.3.2 | Test environment..... | 60 |
| | 12.3.3 | Method of measurement..... | 60 |
| | 12.3.4 | Verdict criteria..... | 61 |
| 12.4 | | Emissions due to intermodulation | 61 |
| | 12.4.1 | Definition..... | 61 |
| | 12.4.2 | Test environment..... | 61 |
| | 12.4.3 | Method of measurement..... | 62 |
| | 12.4.4 | Verdict criteria..... | 62 |
| 12.5 | | Spurious emissions when allocated a transmit channel..... | 63 |
| | 12.5.1 | Definition..... | 63 |
| | 12.5.2 | Radiated emissions | 63 |
| | | 12.5.2.1 Test environment | 63 |
| | | 12.5.2.2 Method of measurement..... | 63 |
| | | 12.5.2.3 Verdict criteria | 64 |
| | 12.5.3 | Conducted spurious emissions..... | 64 |
| | | 12.5.3.1 Test environment | 64 |
| | | 12.5.3.2 Method of measurement..... | 64 |
| | | 12.5.3.3 Verdict criteria | 65 |
| 13 | | Radio receiver testing | 65 |
| 13.1 | | Radio receiver sensitivity..... | 65 |
| | 13.1.1 | Definition..... | 65 |
| | 13.1.2 | Test environment..... | 65 |
| | 13.1.3 | Method of measurement..... | 65 |
| | 13.1.4 | Verdict criteria..... | 66 |
| 13.2 | | Radio receiver reference BER | 66 |
| | 13.2.1 | Definition..... | 66 |
| | 13.2.2 | Test environment..... | 66 |
| | 13.2.3 | Method of measurement..... | 66 |
| | 13.2.4 | Verdict criteria..... | 66 |
| 13.3 | | Radio receiver interference performance..... | 67 |
| | 13.3.1 | Definition..... | 67 |
| | 13.3.2 | Test environment..... | 67 |
| | 13.3.3 | Method of measurement..... | 67 |
| | 13.3.4 | Verdict criteria..... | 67 |
| 13.4 | | Radio receiver blocking case 1: owing to signals occurring at the same time but on other frequencies | 68 |
| | 13.4.1 | Definition..... | 68 |
| | 13.4.2 | Test environment..... | 68 |
| | 13.4.3 | Method of measurement..... | 68 |
| | 13.4.4 | Verdict criteria..... | 69 |
| 13.5 | | Radio receiver blocking case 2: owing to signals occurring at a different time..... | 69 |
| | 13.5.1 | Definition..... | 69 |
| | 13.5.2 | Test environment..... | 69 |
| | 13.5.3 | Method of measurement..... | 70 |
| | 13.5.4 | Verdict criteria..... | 70 |
| 13.6 | | Receiver intermodulation performance | 70 |