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Information Technology — Real Time Locating System (RTLS) Device Conformance Test Methods —

Part 62: High rate pulse repetition frequency Ultra Wide Band (UWB) air interface

Technologies de l'information — Méthodes d'essai de conformité du dispositif des systèmes de localisation en temps réel (RTLS) —

Partie 62: Méthodologie de test de interface aérienne ultra large bande (UWB) à impulsions haute fréquence de répétition

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture techniques*.

ISO/IEC 24769 consists of the following parts, under the general title *Information technology — Real-time locating systems (RTLS) device conformance test methods*:

— *Part 2: Test methods for air interface communication at 2,4 GHz*

— *Part 5: Test methods for chirp spread spectrum (CSS) at 2,4 GHz air interface*

— *Part 61: Low rate pulse repetition frequency Ultra Wide Band (UWB) air interface*

— *Part 62: High rate pulse repetition frequency Ultra Wide Band (UWB) air interface*

Introduction

ISO/IEC 24730-62 defines an air interface for ultra wide band (UWB) Real Time Locating Systems (RTLS) devices used in asset management applications.

This International Standard contains all measurements required to be made on a product in order to establish whether it conforms to ISO/IEC 24730-62.

Test methods for measuring performance of equipment compliant with ISO/IEC 24730-62 are given in ISO/IEC 24770-62.

Information Technology — Real Time Locating System (RTLS) Device Conformance Test Methods —

Part 62:
High rate pulse repetition frequency Ultra Wide Band (UWB) air interface

1 Scope

This International Standard defines the test methods for determining the conformance of Ultra Wide Band real-time locating system (RTLS) tags with the specifications given in the corresponding parts of ISO/IEC 24730-62, but does not apply to the testing of conformity with regulatory or similar requirements.

The test methods require only that the mandatory functions, and any optional functions which are implemented, be verified. This may in appropriate circumstances, be supplemented by further, application specific functionality criteria that are not available to the general case.

Unless otherwise specified, the tests in this International Standard apply exclusively to RTLS tags defined in ISO/IEC 24730-62.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 19762-1, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary — Part 1: General terms relating to AIDC*

ISO/IEC 19762-3, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary — Part 3: Radio frequency identification (RFID)*

ISO/IEC 24730-62:2013, *Information technology — Real time locating systems (RTLS) — Part 62: High rate pulse repetition frequency Ultra Wide Band (UWB) air interface*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19762-3 apply.

3.2 Abbreviated terms

CRC cyclic redundancy check

DUT device under test

PHR PHY header

PHY physical layer

PPM parts per million

PRF pulse repetition frequency

PSD power spectral density

RBW resolution bandwidth

RF radio frequency

RFID radio frequency identification

RTLS real time locating system

SFD start-of-frame delimiter

VBW video bandwidth

UWB ultra wide band

4 Conformance tests for ISO/IEC 24730-62

4.1 General

This International Standard specifies a series of tests to determine the conformance of RTLS tags to the ISO/IEC 24730-62 air interface standard. The results of these tests shall be compared with the values of the parameters specified in ISO/IEC 24730-62 to determine whether the tag under test conforms.

This International Standard also specifies a series of tests to determine the conformance of RTLS RF receivers to the ISO/IEC 24730-62 air interface standard. The results of these tests shall be compared with the values of the parameters specified in ISO/IEC 24730-62 to determine whether the RF receiver under test conforms.

4.2 Default conditions applicable to the test methods

4.2.1 Preface

These conditions apply to all tests.

4.2.2 Test environment

Unless otherwise specified, testing shall take place in an environment of temperature 23° C ± 3° C (73° F ± 5° F) and of relative humidity 25 % to 75 %.

4.2.3 Default tolerance

Unless otherwise specified, a default tolerance of 5 % shall be applied to the quantity values given to specify the characteristics of the test equipment and the test method procedures.

4.2.4 Noise floor at test location

Noise floor at test location shall be measured with the spectrum analyser in the same conditions as the measurement of the DUT, i.e. with same span, RBW, VBW and antenna.

The spectrum analyser shall be configured in acquisition mode for at least 1 min.

The maximum of the measured amplitude shall be at least 60 dB [**TBC**] below the expected value of the amplitude of the measured tag transmission at –16 dBm power with the tag placed at 1 m from the measurement antenna.

Special attention has to be given to spurious emissions, e.g. insufficiently shielded computer monitors. The electromagnetic test conditions of the measurements shall be checked by performing the measurements with and without a tag in the field.

4.2.5 Total measurement uncertainty

The test equipment will introduce a level of measurement uncertainty. The specifications of the test equipment used shall be included in the report.

4.3 UWB RF transmission tests

4.3.1 General

The DUT shall be an RTLS tag. The measurement equipment shall consist of an anechoic chamber as described in Annex A, a calibrated measuring antenna, a spectrum analyser such as a Rohde and Schwarz FSU26[1)] and a suitable receiver consisting of an RF amplifier, signal generator, mixer and a high speed oscilloscope such as an Agilent DSA90804A[2)]. Figure 1 shows the test equipment setup.

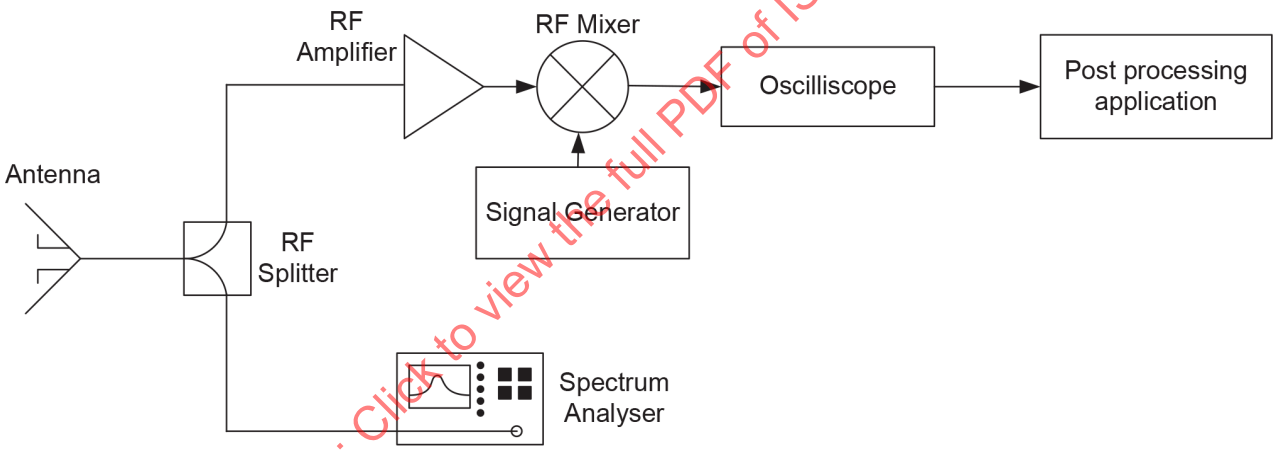

Figure 1 — General setup of equipment for UWB tag RF test

4.3.2 Test Objective

The objective of this test is to verify that the RTLS tag provides the appropriate UWB modulation waveform required for proper system performance.

4.3.3 Test procedure

The tag shall be configured to transmit the maximum length UWB blink that it is intended to send when deployed. The post processing software shall produce metrics for the following parameters to verify compliance of the tag.

1) The Rohde & Schwarz FSU26 is an example of a suitable product available commercially. This information is given for the convenience of users of this standard and does not constitute an endorsement by ISO of this product.

2) The Agilent DSA90804A is an example of a suitable product available commercially. This information is given for the convenience of users of this standard and does not constitute an endorsement by ISO of this product.

4.3.4 Test measurements and requirements

4.3.4.1 Spectral mask

The spectral mask shall be in accordance with ISO/IEC 24730-62:2013, 5.5.3.2, for the channel or channels in which the tag operates.

4.3.4.2 Transmit power

The transmitted power shall be calculated based on the power received at the measurement antenna. The calculated power shall be within ± 2.0 dB of the DUT specified transmit power. Transmit power and spectral density mask shall conform to regulatory constraints for the intended operating region.

4.3.4.3 Transmitter timing

The transmitter shall be capable of chipping at the peak PRF given in ISO/IEC 24730-62:2013, Table 3 with an accuracy of ± 20 ppm. In addition the operating channel centre of transmitted energy shall be at the appropriate value listed in ISO/IEC 24730-62:2013, Table 11 also with an accuracy of ± 20 ppm. The measurements shall be made using 1 MHz resolution bandwidth and a 1 kHz video bandwidth.

4.3.4.4 Message content and structure

The post processing software shall verify the selected message format including preamble, SFD, PHR and data payload are in compliance with the format specified in ISO/IEC 24730-62, all of which are dependent on the selected operational modes, PRF, preamble code, data rate and payload content.

4.3.5 Test report

The test report shall contain the tag distance to the measurement antenna and all of the measured data. A brief narrative of the post processing software used to evaluate the captured signal shall also be included as an annex to the data. As mentioned before (in 4.2.4), the report shall also contain the uncertainties of the measurement equipment.

4.4 Receiver UWB RF tests

4.4.1 Preface

This clause describes the conformance tests for the UWB receiver of the RTLS (reader) nodes, and for those tags supporting ISO/IEC 24730-62 optional two-way communications mode.

4.4.2 General

The DUT shall be an RTLS RF receiver operating in one or more of the channels and operating modes specified in ISO/IEC 24730-62. Example test/measurement equipment could consist of an a tag generator capable of producing an ISO/IEC 24730-62 compliant UWB message in the channel and operating modes supported and configured in the receiver of the DUT.

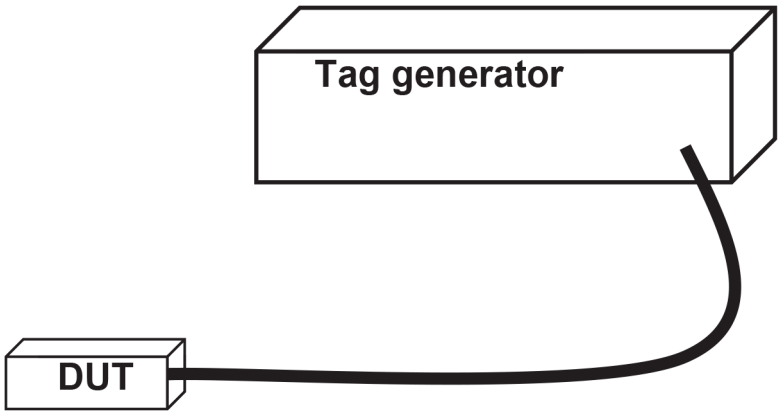

Figure 2 — Setup of equipment for UWB receiver RF Test

4.4.3 Test objective

The objective of this test is to verify that the RTLS RF receiver (DUT) provides the appropriate UWB signal detection required for proper system performance.

4.4.4 Test procedure

The tag generator shall be configured to transmit in the mode of transmission expected by the receiver.

The tag generator should be capable of sending the test blink messages continually and automatically increment the message sequence number described in ISO/IEC 24730-62:2013, 6.1.

4.4.5 Test measurements and requirements

The receiver should be able to receive and decode the tag generator transmissions

4.4.6 Test report

The test report shall contain a summation detection percentage value for each of the tests and all of the measured data. A brief narrative of the post processing software used to evaluate the detection percentage shall also be included as an annex to the data.