SLOVENSKI STANDARD
SIST EN IEC 62228-7:2022

01-junij-2022

Integrirana vezja - Vrednotenje elektromagnetne združljivosti (EMC) oddajnikov-sprejemnikov - 7. del: Oddajniki-sprejemniki CXPI (IEC 62228-7:2022)

Integrated circuits - EMC evaluation of transceivers - Part 7: CXPI transceivers (IEC 62228-7:2022)

Integrierte Schaltungen - Bewertung der elektromagnetischen Verträglichkeit von Sende-Empfangsgeräten – Teil 7: CXPI-Sende-Empfangsgeräte (IEC 62228-7:2022)

Circuits intégrés - Évaluation de la CEM des émetteurs-récepteurs - Partie 7: Émetteurs-récepteurs CXPI (IEC 62228-7:2022)

Ta slovenski standard je istoveten z: **EN IEC 62228-7:2022**

ICS:

31.200	Integrirana vezja, mikroelektronika	Integrated circuits. Microelectronics

SIST EN IEC 62228-7:2022 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 62228-7

April 2022

ICS 31.200

English Version

Integrated circuits - EMC evaluation of transceivers - Part 7: CXPI transceivers (IEC 62228-7:2022)

Circuits intégrés - Évaluation de la CEM des émetteurs-récepteurs - Partie 7: Émetteurs-récepteurs CXPI (IEC 62228-7:2022)

Integrierte Schaltungen - Bewertung der elektromagnetischen Verträglichkeit von Sende-Empfangsgeräten - Teil 7: CXPI-Sende-Empfangsgeräte (IEC 62228-7:2022)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 47A/1130/FDIS, future edition 1 of IEC 62228-7, prepared by SC 47A "Integrated circuits" of IEC/TC 47 "Semiconductor devices" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62228-7:2022.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-12-29
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CISPR 16-1-1	NOTE	Harmonized as EN IEC 55016-1-1

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61967-1	-	Integrated circuits - Measurement of electromagnetic emissions - Part 1: General conditions and definitions	EN IEC 61967-1	-
IEC 61967-4	-	Integrated circuits - Measurement of electromagnetic emissions - Part 4: Measurement of conducted emissions - 1 ohm/150 ohm direct coupling method	EN IEC 61967-4	-
IEC 62132-1	-	Integrated circuits - Measurement of electromagnetic immunity - Part 1: General conditions and definitions	EN 62132-1	-
IEC 62132-4	2006	Integrated circuits - Measurement of electromagnetic immunity 150 kHz to 1 GHz - Part 4: Direct RF power injection method	EN 62132-4	2006
IEC 62215-3	-	Integrated circuits - Measurement of impulse immunity - Part 3: Non-synchronous transient injection method	EN 62215-3	-
IEC 62228-1	-	Integrated circuits - EMC evaluation of transceivers - Part 1: General conditions and definitions	EN IEC 62228-1	-
ISO 7637-2	-	Road vehicles - Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only	-	-
ISO 10605	-	Road vehicles - Test methods for electrical disturbances from electrostatic discharge	-	-
ISO 20794-4	-	Road vehicles - Clock extension peripheral interface (CXPI) - Part 4: Data link layer and physical layer	-	-

IEC 62228-7

Edition 1.0 2022-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Integrated circuits – EMC evaluation of transceivers – Part 7: CXPI transceivers

Circuits intégrés – Évaluation de la CEM des émetteurs-récepteurs – Partie 7: Émetteurs-récepteurs CXPI

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 31.200

ISBN 978-2-8322-1083-2

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

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IEC 62228-7 has been prepared by subcommittee 47A: Integrated circuits, of IEC technical committee 47: Semiconductor devices. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
47A/1130/FDIS	47A/1133/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 62228 series, published under the general title *Integrated circuits – EMC evaluation of transceivers*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTEGRATED CIRCUITS – EMC EVALUATION OF TRANSCEIVERS –

Part 7: CXPI transceivers

1 Scope

This part of IEC 62228 specifies test and measurement methods for the EMC evaluation of CXPI transceiver ICs under network condition. It defines test configurations, test conditions, test signals, failure criteria, test procedures, test setups and test boards. This specification is applicable for standard CXPI transceiver ICs and ICs with embedded CXPI transceiver and covers

- the emission of RF disturbances,
- the immunity against RF disturbances,
- the immunity against impulses and
- the immunity against electrostatic discharges (ESD).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61967-1, *Integrated circuits – Measurement of electromagnetic emissions – Part 1: General conditions and definitions*

IEC 61967-4, *Integrated circuits – Measurement of electromagnetic emissions – Part 4: Measurement of conducted emissions – 1 Ω/150 Ω direct coupling method*

IEC 62132-1, *Integrated circuits – Measurement of electromagnetic immunity – Part 1: General conditions and definitions*

IEC 62132-4:2006, *Integrated circuits – Measurement of electromagnetic immunity 150 kHz to 1 GHz – Part 4: Direct RF power injection method*

IEC 62215-3, *Integrated circuits – Measurement of impulse immunity – Part 3: Non-synchronous transient injection method*

IEC 62228-1, *Integrated circuits – EMC evaluation of transceivers – Part 1: General conditions and definitions*

ISO 7637-2, *Road vehicles – Electrical disturbances from conduction and coupling – Part 2: Electrical transient conduction along supply lines only*

ISO 10605, *Road vehicles – Test methods for electrical disturbances from electrostatic discharge*

ISO 20794-4, *Road vehicles – Clock extension peripheral interface (CXPI) – Part 4: Data link layer and physical layer*

ISO 20794-7:2020, *Road vehicles – Clock extension peripheral interface (CXPI) – Part 7: Data link and physical layer conformance test plan*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the terms and definitions given in IEC 62228-1, IEC 61967-1 and IEC 62132-1, as well as the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Terms and definitions

3.1.1
global pin
pin that carries a signal or power, which enters or leaves the application board without any active component in between

3.1.2
standard CXPI transceiver IC
standalone CXPI transceiver according to ISO 20794-4 or IC with integrated CXPI transceiver cell with access to CXPI RXD and TXD signal

3.1.3
IC with embedded CXPI transceiver
IC with integrated CXPI transceiver cell and CXPI protocol handler but without access to CXPI RXD or TXD signal

3.1.4
mandatory components, pl
components needed for proper function of IC as specified by the IC manufacturer

3.2 Abbreviated terms

ASSP	application specific standard product
CRC	cyclic redundancy check
CXPI	Clock Extension Peripheral Interface
DLL	data link layer
EN	enable
FI	frame information
IBS	inter byte space
NRZ	non-return to zero
PCB	printed circuit board
PID	protected identifier
PMA	physical media attachment
PS	physical signalling
PWM	pulse width modulation
RX_{PWM}	output signal for receiver in CXPI bus-line driver
RXD_{NRZ}	output signal for receiver in CXPI codec circuit

TX_{PWM}	input signal for transmitter in CXPI bus-line driver
TXD_{NRZ}	input signal for transmitter in CXPI codec circuit
UART	universal asynchronous receiver / transmitter

4 General

The intention of this document is to evaluate the EMC performance of CXPI transceiver ICs under application conditions in a minimal network. CXPI Transceiver ICs are generally classified into three types, as listed in Table 1.

Figure 1 shows a sample configuration of each type of CXPI transceiver IC. The overview of the PHY sublayers is following ISO 20794-4. Standard type-A comprises a CXPI transceiver IC that contains the PS sublayer and the PMA sublayer. Standard type-B contains only the PMA sublayer. The Embedded type includes a microcontroller or ASSP function, in addition to the functions of Standard type-A. The PMA sublayer transmits and receives communication data on the bus line in the PWM signal format. The PS sublayer has the clock generation function, the encoding and decoding of CXPI frames and the bit-wise collision resolution logic. The microcontroller or ASSP transmits and receives the communication data in the NRZ signal format according to the specifications of the application.

Table 1 – Types for CXPI transceiver

Transceiver classification	CXPI transceiver type	Communication sublayer implementation
Standard CXPI transceiver IC	Standard type-A	with PMA and PS sublayer
	Standard type-B	with PMA sublayer only
IC with embedded CXPI transceiver	Embedded type	with PMA, PS sublayer and DLL