
**Cards and security devices for
personal identification — Contactless
proximity objects —**

**Part 4:
Transmission protocol**

**AMENDMENT 1: Dynamic power level
management**

*Cartes et dispositifs de sécurité pour l'identification personnelle —
Objets sans contact de proximité —*

Partie 4: Protocole de transmission

AMENDEMENT 1: Gestion dynamique de niveau de puissance





COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier; Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

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.

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 or www.iec.ch/members_experts/refdocs).

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) or the IEC list of patent declarations received (see patents.iec.ch).

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

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and security devices for personal identification*.

A list of all parts in the ISO/IEC 14443 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

STANDARDSISO.COM : Click to view the full PDF of ISO/IEC 14443-4:2018/AMD1:2021

Cards and security devices for personal identification — Contactless proximity objects —

Part 4: Transmission protocol

AMENDMENT 1: Dynamic power level management

Page 3, Clause 4

Add the following symbols:

" H_{LP} "	minimum requested field strength"
" $H_{step, max}$ "	PCD maximum field strength step increase or step decrease"
" PLI_{CID} "	Power Level Indication in CID field"
" t_{PL} "	guard time for PCD power level change"

Page 15, 7.1

Replace the third dash of the 2nd paragraph (i.e. "power indication; and") with "power level indication (optional); and".

Page 20, 7.4

Replace "1 byte long INF field that consists of two parts (see Figure 21)" at the end of the 1st paragraph with "1 byte long INF field that consists of three parts (see Figure 21)".

Replace the first dash after the 1st paragraph with:

- If b8 is set to (1)b, it indicates that the PICC requests the maximum available field strength to process the current and next commands until indicated otherwise by PLI_{CID} . In the operating volume of each supported class, the PCD shall provide at least the corresponding minimum field strength H_{min} specified in ISO/IEC 14443-2 and should provide more if available, while respecting all magnetic field strength requirements specified in 7.5. Interpretation of b8 by the PCD is optional.
- b7 codes t_{PL} value. $t_{PL} = 5$ ms if b7 is set to (1)b, otherwise t_{PL} equals the default value specified in ISO/IEC 14443-3:2018/Amd 1:2021, 6.5.2.3.

Page 20, 7.4, Figure 21

Replace Figure 21 with the following figure:

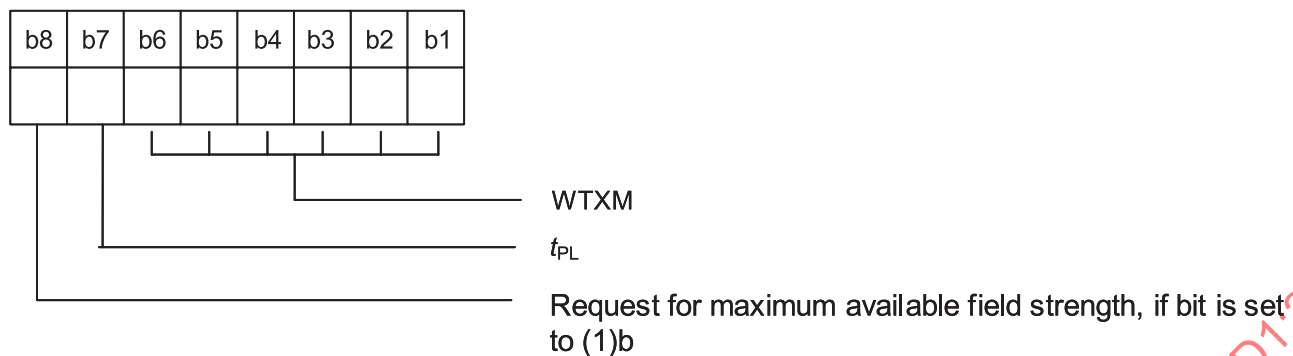


Figure 21 — Coding of INF field of an S(WTX) request

Page 21, 7.5

Replace the subclause with the following:

"

7.5 Power level indication (optional)

In the PROTOCOL state, the PICC may use PLI_{CID} to give power level indications to the PCD and PLI_{CID} shall be coded as specified in Table 4 using two bits embedded in the CID field (when present) sent by the PICC (see 7.2.2.2). See Annex H for examples of PLI_{CID} usage.

A PICC that codes:

- $PLI_{CID} = (00)b$ does not provide any received power level indication;
- $PLI_{CID} = (01)b$ indicates the received field strength is less than $(H_{LP} + H_{step, max})$ (see ISO/IEC 14443-2:2020/Amd 1); when receiving $PLI_{CID} = (01)b$, the PCD should not decrease its field strength;
- $PLI_{CID} = (10)b$ indicates the received field strength is at least $(H_{LP} + H_{step, max})$; and a one-step decrease may increase the PICC response time; when receiving $PLI_{CID} = (10)b$, the PCD may decrease its field strength by one step only;
- $PLI_{CID} = (11)b$ indicates the received field strength is at least $(H_{LP} + H_{step, max})$; and a one-step decrease is not expected to increase the PICC response time; when receiving $PLI_{CID} = (11)b$, the PCD may decrease its field strength by one step only.

The PCD may increase its field strength in one or several steps before any SOF or start of communication.

Table 4 — Coding of PLI_{CID}

PLI_{CID}	Power level indication
(00)b	No indication for field strength
(01)b	Field strength is less than $(H_{LP} + H_{step, max})$
(10)b	Field strength is at least $(H_{LP} + H_{step, max})$ One-step decrease may increase the PICC response time
(11)b	Field strength is at least $(H_{LP} + H_{step, max})$ One-step decrease is not expected to increase the PICC response time

After receiving the power level indication from the PICC, the PCD may change its magnetic field strength in accordance with the power level indication before sending the next block.

Such PCD:

- should not change its magnetic field strength when several PICCs are activated;
- may produce magnetic field strength steps which shall not exceed $H_{\text{step, max}}$ as defined in ISO/IEC 14443-2:2020/Amd 1:2021, 6.3;
- shall produce a stable magnetic field strength for at least t_{PL} between any consecutive two magnetic field strength steps and before sending start of communication or SOF;
- shall respect the most recent t_{PL} value indicated by the PICC by PLI_{ATQ} (see ISO/IEC 14443-3:2018/Amd 1:2021, 6.5.2.3) or by b7 in the INF field of an S(WTX) request (see 7.4), or the default t_{PL} value specified in ISO/IEC 14443-3:2018/Amd 1:2021, 6.5.2.3, as long as no such indication was received.

WARNING — A PCD decreasing the field strength in dynamic situations may cause the PICC to go into POWER-OFF state. A PCD expecting fast moving PICCs, which is typically the case in payment or ticketing systems should handle its power level with special care.

Interpretation of the power level indication by the PCD is optional.

”

Page 55, Annex H

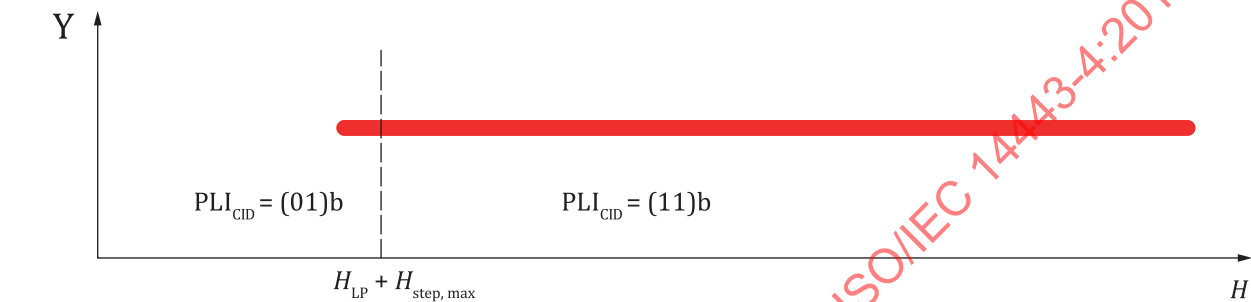
Add the following Annex H after Annex G:

Annex H
(informative)

Examples of PLI_{CID} usage

H.1 PICC response time not depending on field strength

An example of PLI_{CID} settings for a PICC whose response time does not depend on its field strength is shown in Figure H.1.

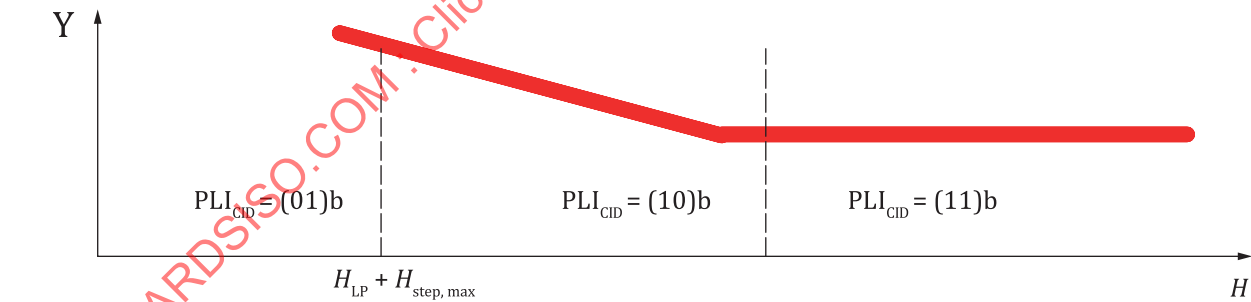


Key
Y PICC response time

Figure H.1 — PICC response time not depending on field strength

H.2 PICC response time partly depending on field strength

An example of PLI_{CID} settings for a PICC whose response time partly depends on its field strength is shown in Figure H.2.



Key
Y PICC response time

Figure H.2 — PICC response time partly depending on field strength

H.3 PICC response time always depending on field strength

An example of PLI_{CID} settings for PICC whose response time always depends on its field strength is shown in Figure H.3.