
Identification cards — Test methods —

Part 6:

Proximity cards

AMENDMENT 4: Bit rates of $fc/8$, $fc/4$ and $fc/2$ and frame size from 512 to 4096 bytes

Cartes d'identification — Méthodes d'essai —

Partie 6: Cartes de proximité

AMENDEMENT 4: Débits binaires de $fc/8$, $fc/4$ et $fc/2$ et tailles de trame allant de 512 à 4096 octets





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Foreword

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The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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Amendment 4 to ISO/IEC 10373-6:2011 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

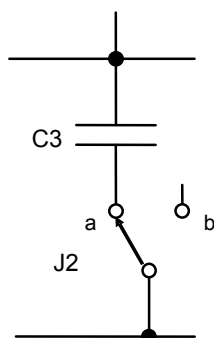
Identification cards — Test methods —

Part 6: Proximity cards

AMENDMENT 4: Bit rates of $fc/8$, $fc/4$ and $fc/2$ and frame size from 512 to 4096 bytes

Page 10, Figure 5

Replace component "C3" in Figure 5 with the following:



Page 11, 5.4.2

Add the following two paragraphs at the end of 5.4.2:

"Position 'a' of J2 shall be used for testing bit rates of $fc/128$, $fc/64$, $fc/32$ and $fc/16$.

Position 'b' of J2 shall be used for testing bit rates of $fc/8$, $fc/4$ and $fc/2$."

Page 16, 7.1.4.1

Replace paragraph with the following:

"This test is used to determine the index of modulation of the PCD field as well as the rise and fall times and the overshoot values as defined in ISO/IEC 14443-2 for all supported PCD to PICC bit rates."

Page 17, 7.1.4.2

Replace step g) with the following:

- g) Repeat steps c) to f) for various positions within the operating volume and all supported PCD to PICC bit rates.

Page 17, 7.1.5.1

Replace paragraph with the following:

"This test is used to verify that a PCD correctly detects the load modulation of a PICC which conforms to ISO/IEC 14443-2 for PICC to PCD bit rates of $f_c/128$, $f_c/8$, $f_c/4$ and $f_c/2$, if supported."

Page 17, 7.1.5.2

Replace step h) with the following:

- h) Repeat steps b) to g) for various positions within the operating volume for PICC to PCD bit rates of $f_c/128$, $f_c/8$, $f_c/4$ and $f_c/2$, if supported.

Page 18, 7.2.1.1

Delete NOTE and replace first sentence of paragraph with the following:

"The purpose of this test is to determine the load modulation amplitude V_{LMA} of the PICC within the operating field range [H_{min} , H_{max}] as specified in ISO/IEC 14443-2 for PICC to PCD bit rates of $f_c/128$, $f_c/8$, $f_c/4$ and $f_c/2$, if supported."

Page 18, 7.2.1.2

Replace second paragraph of Step 2 with the following:

"A REQA or a REQB command sequence as defined in ISO/IEC 14443-3 shall be sent by the Test PCD to obtain a signal or load modulation response from the PICC when testing PICC transmission at a bit rate of $f_c/128$. An S(PARAMETERS) sequence as defined in ISO/IEC 14443-4 and an I-block shall be sent by the Test PCD to obtain a signal or load modulation response from the PICC when testing optional PICC transmission bit rates of $f_c/8$, $f_c/4$ and $f_c/2$."

Add Note 1 after second paragraph of Step 2 and renumber subsequent Notes:

"NOTE 1 No load modulation test is required for bit rates of $f_c/64$, $f_c/32$ and $f_c/16$ because these bit rates use the same subcarrier frequency of $f_c/128$."

Page 19, 7.2.2.2

Replace 7.2.2.2 heading text with the following:

"PICC Type A for bit rates of $f_c/128$, $f_c/64$, $f_c/32$ and $f_c/16$ "

Page 20, 7.2.2.3

Replace 7.2.2.3 heading text with the following:

"PICC Type B for bit rates of $f_c/128$, $f_c/64$, $f_c/32$ and $f_c/16$ "

Page 20, 7.2.2.3.1

Replace first paragraph with the following:

"Three test conditions are defined with timings at the border of the PICC modulation waveform timing parameters zone defined in ISO/IEC 14443-2, 9.1.2:"

Replace last dash text with the following:

- minimum and maximum modulation index m for the associated field strength applied (see ISO/IEC 14443-2, 9.1.2).

Page 20, 7.2.2.3.2

Replace second, third and fourth paragraph with the following:

"For each optional PCD to PICC bit rate supported by the PICC, the PICC shall operate under the conditions defined in 7.2.2.3.1 after selection of that optional bit rate. This PICC shall respond correctly to an I-block transmitted at that optional bit rate."

Page 20

Renumber existing subclause 7.2.2.4 to 7.2.2.5 and add new subclause 7.2.2.4:

7.2.2.4 PICC Type A or Type B for bit rates of $fc/8$, $fc/4$ and $fc/2$

See 7.2.2.3.

Page 23, Annex A

Replace all occurrences of "for bit rates of $fc/64$, $fc/32$ and $fc/16$ " with "for bit rates higher than $fc/128$ ".

Page 27, Table A.1

Replace "From $fc/128$ to $fc/16$ " with "All bit rates".

Page 34

Add new subclause E.2.1 and move second sentence of E.2 and Figure E.2 to this subclause:

E.2.1 Sampling for bit rates of $fc/128$, $fc/64$, $fc/32$ and $fc/16$

Page 35

Add new subclause E.2.2:

E.2.2 Sampling for bit rates of $fc/8$, $fc/4$ and $fc/2$

The time and voltage data of a PCD frame containing short and long modulation pulses (preferably a complete S(DESELECT) command) as illustrated in Figure E.3, with at least 20 carrier periods before the first and after the last modulation pulse, shall be transferred to a suitable computer.

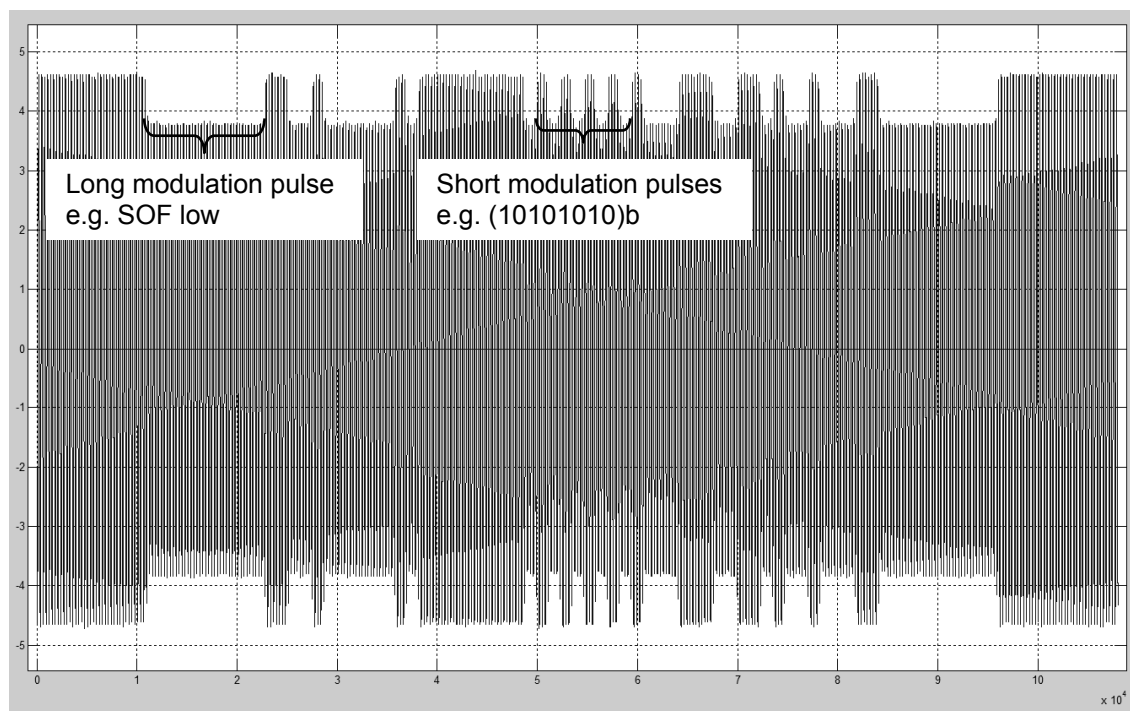


Figure E.3 — Modulation pulses

Page 35

Add new subclause E.3.1 and move existing paragraph of E.3 and Figure E.3 to this subclause:

E.3.1 Filtering for bit rates of $fc/128$, $fc/64$, $fc/32$ and $fc/16$

Page 35

Add new subclause E.3.2:

E.3.2 Filtering for bit rates of $fc/8$, $fc/4$ and $fc/2$

A 4th order, Butterworth type band pass filter with center frequency of 13,56 MHz and 15 MHz 3-dB bandwidth shall be used for filtering the DC and higher harmonic components.

Page 36

Add new subclause E.5.1 and move existing paragraph of E.5 and Figure E.4 to this subclause:

E.5.1 Envelope smoothing for bit rates of $fc/128$, $fc/64$, $fc/32$ and $fc/16$

Page 36

Add new subclause E.5.2:

E.5.2 Envelope smoothing for bit rates of $fc/8$, $fc/4$ and $fc/2$

No smoothing of signal envelope shall be applied.

Page 36, E.6

Add the following paragraph and figure after the paragraph:

For bit rates of $fc/8$, $fc/4$ and $fc/2$ the minimum value of modulation index m shall be determined within the complete PCD frame (see Figure E.5.). The PCD frame shall contain (10101010)b.

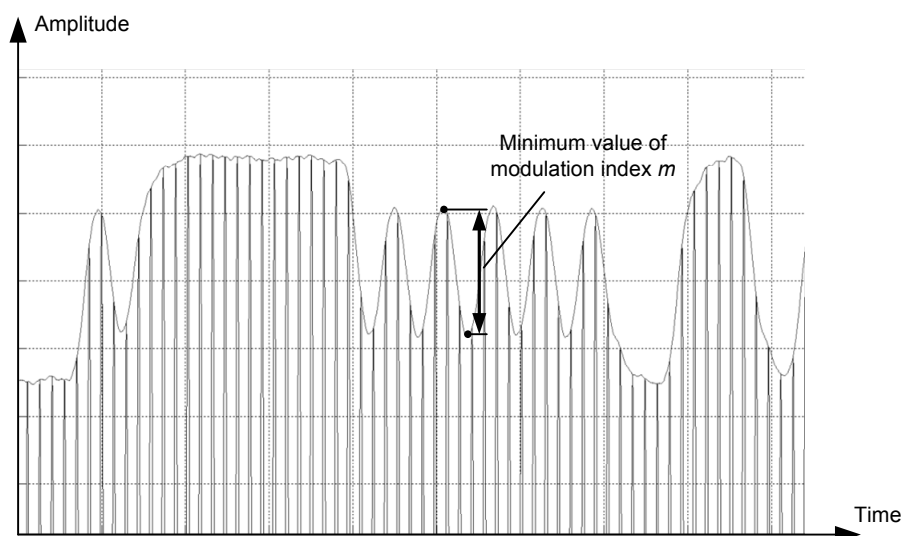


Figure E.5 — Minimum value of modulation index m

Page 36, E.7

Add at the end of paragraph:

For bit rates of $fc/8$, $fc/4$ and $fc/2$ the timings shall be determined at positions with long modulation pulse positions e.g. t_i at transition to SOF low and t_r at transition to EOF high.

Page 38

Add after line "double b; //Type B":

```
"double bVHBR; //Bit rates of  $fc/8$ ,  $fc/4$  and  $fc/2$ "
```

Page 53

Replace function "createtime" with:

```
"void createtime(TIMES *new, double tr, double tf, double b, double bVHBR, double
trstartind, double trendind, double tfstartind, double tfendind, double t1,
double t1startind, double t1start, double t1endind, double t2, double t2startind,
double t2start, double t3, double t3end, double t3endind, double t4, double
t4endind, double t5, double t5startind, double t6, double t6end, double t6endind,
double a, double tploone)"
```

Add after line "new->b=b;":

```
"new->bVHBR=bVHBR;"
```

Page 59

Add following function:

```
// Finds the value of m_min for bit rates of  $fc/8$ ,  $fc/4$  and  $fc/2$ 

void Mminfinder(double *env, double Hmax, double Hmin, double *HmaxVHBR, TIMES
*timeres, int numsamples)
{
    int i=0;
    int j=0;
    double compare_hi=0.0;
    double compare_lo=0.0;
    double compare=0.0;
    double difference=0.0;
    int going_up=0;
    double ampl=0.0;
    double ampl_max=0.0;    // represents the amplitude (Hmax-b), and indirectly
    "m".
    double m_deviation=0.0; // countermeasure 1: m_min < 0.2*m is not considered
    double Hmax_cm=0.0;    // countermeasure 2: m_min does not start or end on
    borders
    double b_cm=0.0;
    double mmin=0.0;
    double mmin_cum=0.0;

    // Skip all zeros
    while (env[j]==0)
        j++;

    // where do we start?
    difference=env[j]-env[j+1];
    if (difference<0)
```

```

{
    going_up=1; // going up
    compare_lo=env[j];
}
else if (difference>0)
{
    going_up=0; // going down
    compare_hi=env[j];
}
compare=env[j];

ampl_max=(Hmax-Hmin);
m_deviation=ampl_max*0.2;
Hmax_cm=Hmax*0.95;
b_cm=Hmin*1.05;
timeres->bVHBR=0;

for (i=j; i<=numsamples-j; i++)
{
    if (going_up==0) // GOING DOWN
    {
        if (compare>=env[i])
        {
            compare=env[i];
        }
        else if (compare<env[i])
        {
            compare=env[i];
            compare_lo=env[i];
            going_up=1; // change direction
            ampl=(compare_hi-compare_lo);
            mmin=(ampl/(compare_hi+compare_lo))*100;
            if (ampl>m_deviation && ampl<ampl_max && (compare_hi<Hmax_cm ||
compare_lo>b_cm)) //Countermeasures
            {
                *HmaxVHBR=compare_hi;
                timeres->bVHBR=compare_lo;
                ampl_max=ampl;
            }
        }
    }
    if (going_up==1) // GOING UP
    {
        if (compare<=env[i])
        {
            compare=env[i];
        }
        else if (compare>env[i])
        {
            compare=env[i];
            compare_hi=env[i];
            going_up=0; // change direction
            ampl=(compare_hi-compare_lo);
            mmin=(ampl/(compare_hi+compare_lo))*100;
            if (ampl>m_deviation && ampl<ampl_max && (compare_hi<Hmax_cm ||
compare_lo>b_cm)) //Countermeasures
            {
                *HmaxVHBR=compare_hi;
                timeres->bVHBR=compare_lo;
                ampl_max=ampl;
            }
        }
    }
}

```