Telecommunications and Information Exchange Between Systems

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Proximity

Part	abbreviations	Definitions
14443-1	integrated circuit （IC)	electronic component designed to perform processing and/or memory functions
14443-1	contactless	pertaining to the achievement of signal exchange with, and supply of power to, the card without the use of galvanic elements (i.e. the absence of an ohmic path from the external interfacing equipment to the integrated circuit(s) contained within the card)
14443-1	contactless integrated circuit card	card into which integrated circuit and coupling means have been placed, such that communication to such integrated circuit is done in a contactless manner
14443-1	operate as intended	operates in the manner described by the manufacturer's specification in accordance with ISO/IEC 14443
14443-1	PICC	combination of antenna dimension and loading effect
14443-1	PICC class	combination of antenna dimension and loading effect
14443-2	bit duration	time during which a logic level is defined, at the end of which a new bit starts
14443-2	binary phase shift keying	phase shift keying where the phase shift is 180°, resulting in two phase state possibilities
14443-2	modified Miller	a method of bit coding whereby a logic level during a bit-duration is represented by the position of a pulse within the bit-frame
14443-2	modulation index m	defined as [1-b]/[1+b] where b is the ratio between the modulated amplitude and the initial signal amplitude (the value of the index may be expressed as a percentage)
14443-2	NRZ-L	method of bit coding whereby a logic level during a bit duration is represented by one of two defined physical states of a communication medium
14443-2	subcarrier	signal of frequency fs used to modulate a carrier of frequency fc
14443-2	Manchester	method of bit coding whereby a logic level during a bit duration is represented by a sequence of two defined physical states of a communication medium (the order of the physical states within the sequence defines the logical state)
14443-2	TR0	guard time between the end of a PCD transmission and the start of the PICC subcarrier generation
14443-2	TR1	synchronization time between the start of the PICC subcarrier generation and the start of the PICC subcarrier modulation
14443-3	anticollision loop	algorithm used to prepare for dialogue between PCD and one or more PICCs out of the total number of PICCs responding to a request command
14443-3	byte	a byte consists of 8 bits of data designated b8 to b1, from the most significant bit (MSB, b8) to the least significant bit (LSB, b1)
14443-3	collision	transmission by two PICCs in the same PCD energizing field and during the same time period, such that the PCD is unable to distinguish from which PICC the data originated
14443-3	elementary time unit (etu)	calculated by the following formula: 1 etu = 128 / (D x fc) where D$\in$ {1,2,4,8} The initial value of the divisor D is 1, giving the initial etu as follows: 1 etu = 128 / fc where fc is the carrier frequency as defined in ISO/IEC 14443-2.

14443-3	frame	a frame is a sequence of data bits and optional error detection bits, with frame delimiters at start and end
14443-3	higher layer protocol	a protocol layer (not described in this part of ISO/IEC 14443) that makes use of the protocol layer defined in this part of ISO/IEC 14443 to transfer information belonging to the application or higher layers of protocol that is not described in this part of ISO/IEC 14443
14443-3	request command	command requesting PICCs of the appropriate type to respond if they are available for initialization
14443-4	bit duration	one elementary time unit (etu), calculated by the following formula: $1\ etu = 128 / (D \times fc)$ the initial value of the divisor D is 1, giving the initial etu as follows: $1\ etu = 128 / fc$ where fc is the carrier frequency as defined in ISO/IEC 14443-2.
14443-4	block	special type of frame, which contains a valid protocol data format special type of frame, which contains a valid protocol data format NOTE A valid protocol data format includes I-blocks, R-blocks or S-blocks.
14443-4	invalid block	type of frame, which contains an invalid protocol format NOTE A time-out, when no frame has been received, is not interpreted as an invalid block.
14443-4	frame	sequence of bits as defined in ISO/IEC 14443-3 NOTE The PICC Type A uses the standard frame defined for Type A and the PICC Type B uses the frame defined for Type B.
10373-6	base standard	the standard which the test method is used to verify conformance to
10373-6	CascadeLevels	number of cascade levels of the PICC
10373-6	Class 1 PICC	PICC antenna is located as defined in ISO/IEC 14443-1:2008
10373-6	Command Set	set describing the PICC commands during initialization and anticollision
10373-6	Mute	no response within a specified timeout, e.g. expiration of FWT
10373-6	PICC States	different PICC states during initialization and anticollision
10373-6	Scenario	defined typical protocol and application specific communication to be used with the test methods defined in this part of ISO/IEC 10373
10373-6	State Transition Map	map describing all possible state transitions, i.e. the map: PICC States ´ Command Set ® PICC States
10373-6	Test Initial State (TIS)	element from PICC States that is the PICC state before performing a specific PICC command from Command Set
10373-6	test method	a method for testing characteristics of identification cards for the purpose of confirming their compliance with International Standards
10373-6	Test Target State (TTS)	element from PICC States that is the PICC state after performing a specific PICC command from Command Set

	Terms	Definitions
14443-2	ASK	Amplitude Shift Keying
14443-2	BPSK	Binary Phase Shift Keying
14443-2	NRZ-L	Non-Return to Zero, (L for level)
14443-2	OOK	On/Off Keying
14443-2	PauseA	PCD Modulation pulse, Type A
14443-2	PCD	Proximity Coupling Device
14443-2	PICC	Proximity Card or object
14443-2	RF	Radio Frequency
14443-2	a	Pulse shape factor, Type A
14443-2	b	Ratio between the modulated and initial signal amplitude, Type B
14443-2	fc	Frequency of operating field (carrier frequency)
14443-2	fs	Frequency of subcarrier
14443-2	H	Equivalent homogenous magnetic field strength
14443-2	HINITIAL	Field strength of the unmodulated RF field
14443-2	hovs	Modulation overshoot, Type A
14443-2	hr	Modulation overshoot, Type B
14443-2	hf	Modulation undershoot, Type B
14443-2	Ø0	Initial phase of the subcarrier
14443-2	t1	PauseA length
14443-2	t2	PauseA "Low" time for bit rate of fc/128
14443-2	t3	PauseA rise time for bit rate of fc/128
14443-2	t4	PauseA rise time section for bit rate of fc/128
14443-2	t5	PauseA "Low" time for bit rates of fc/64, fc/32, fc/16
14443-2	t6	PauseA rise time for bit rates of fc/64, fc/32, fc/16
14443-2	t6,max, PCD	Maximum value of t6 for PCD transmission
14443-2	t6, max, PICC	Maximum value of t6 for PICC reception
14443-2	tb	Bit duration

14443-2	tf	Modulation fall time
14443-2	tf, max, PCD	Maximum fall time for PCD transmission
14443-2	tf, max, PICC	Maximum fall time for PICC reception
14443-2	tr	Modulation rise time
14443-2	tr, max, PCD	Maximum rise time for PCD transmission
14443-2	tr, max, PICC	Maximum rise time for PICC reception
14443-2	tx	Pulse position
14443-2	VLMA	Load modulation amplitude
14443-3	ADC	Application Data Coding, Type B
14443-3	AFI	Application Family Identifier. Card preselection criteria by application, Type B
14443-3	APf	Anticollision Prefix f, used in REQB/WUPB, Type B
14443-3	APn	Anticollision Prefix n, used in Slot-MARKER command, Type B
14443-3	ATQA	Answer To reQuest, Type A
14443-3	ATQB	Answer To reQuest, Type B
14443-3	ATTRIB	PICC selection command, Type B
14443-3	BCC	Block Check Character (UID CLn check byte), Type A
14443-3	CID	Card IDentifier
14443-3	CLn	Cascade Level n, Type A
14443-3	CT	Cascade Tag, Type A
14443-3	CRC_A	Cyclic Redundancy Check error detection code, Type A
14443-3	CRC_B	Cyclic Redundancy Check error detection code, Type B
14443-3	D	Divisor
14443-3	E	End of communication, Type A
14443-3	EGT	Extra Guard Time, Type B
14443-3	EOF	End Of Frame, Type B
14443-3	etu	elementary time unit
14443-3	FDT	Frame Delay Time, Type A
14443-3	fc	carrier frequency

14443-3	FO	Frame Option, Type B
14443-3	fs	subcarrier frequency
14443-3	FWI	Frame Waiting time Integer
14443-3	FWT	Frame Waiting Time
14443-3	HLTA	HaLT command, Type A
14443-4	ACK	positive ACKnowledgement
14443-4	ATS	Answer To Select
14443-4	ATQA	Answer To reQuest, Type A
14443-4	ATQB	Answer To reQuest, Type B
14443-4	CID	Card IDentifier
14443-4	CRC	Cyclic Redundancy Check, as defined for each PICC Type in ISO/IEC 14443-3
14443-4	D	Divisor
14443-4	DR	Divisor Receive (PCD to PICC)
14443-4	DRI	Divisor Receive Integer (PCD to PICC)
14443-4	DS	Divisor Send (PICC to PCD)
14443-4	DSI	Divisor Send Integer (PICC to PCD)
14443-4	EDC	Error Detection Code
14443-4	etu	elementary time unit
14443-4	fc	carrier frequency
14443-4	FSC	Frame Size for proximity Card
14443-4	FSCI	Frame Size for proximity coupling Device Integer
14443-4	FSD	Frame Size for proximity coupling Device
14443-4	FSDI	Frame Size for proximity coupling Device Integer
14443-4	FWI	Frame Waiting time Integer
14443-4	FWT	Frame Waiting Time
14443-4	FWTTEMP	temporary Frame Waiting Time
14443-4	HLTA	HALT Command, Type A
14443-4	I-block	Information block

14443-4	INF	INformation Field
14443-4	MAX	Index to define a maximum value
14443-4	MIN	Index to define a minimum value
14443-4	NAD	Node ADdress
14443-4	NAK	Negative AcKnowledgement
14443-4	OSI	Open Systems Interconnection
14443-4	PCB	Protocol Control Byte
14443-4	PCD	Proximity Coupling Device
14443-4	PICC	Proximity Card
14443-4	PPS	Protocol and Parameter Selection
14443-4	PPSS	Protocol and Parameter Selection Start
14443-4	PPS0	Protocol and Parameter Selection parameter 0
14443-4	PPS1	Protocol and Parameter Selection parameter 1
14443-4	R-block	Receive ready block
14443-4	R(ACK)	R-block containing a positive acknowledge
14443-4	R(NAK)	R-block containing a negative acknowledge
14443-4	RATS	Request for Answer To Select
14443-4	REQA	REQuest Command, Type A
14443-4	RFU	Reserved for Future Use by ISO/IEC
14443-4	S-block	Supervisory block
14443-4	SAK	Select AcKnowledge
14443-4	SFGI	Start-up Frame Guard time Integer
14443-4	SFGT	Start-up Frame Guard Time
14443-4	WUPA	Wake-Up Command, Type A
14443-4	WTX	Waiting Time eXtension
14443-4	WTXM	Waiting Time eXtension Multiplier
14443-4	I(c)n(inf [,CID=cid] [,NAD=nad] [,~CRC])	ISO/IEC 14443-4 I-block with chaining bit $c \in \{1,0\}$, block number $n \in \{1,0\}$ and information field inf. By default no CID and no NAD will be transmitted. If CID=cid$\in \{0...15\}$ is specified, it will be transmitted as second parameter. If

		NAD=nadÎ{0...'FF'} is specified it will be transmitted as third parameter (or second parameter if no CID is transmitted). If the corresponding to the type of the PICC will be transmitted by defaultliteral '~CRC' is not specified, a valid CRC (i.e. CRC_A or CRC_B)
14443-4	(xxxxx)b	Data bit representations
14443-4	'XY'	Hexadecimal notation, equal to XY in base 16
10373-6	ATA(cid)	Answer to ATTRIB, i.e. (mbli+cid CRC_B), with mbli an arbitrary hex (see ISO/IEC 14443-3:2001, 7.11)
10373-6	ATTRIB(cid, fsdi)	Default ATTRIB command with PUPI from ATQB, CID=cid and Maximum Frame Size Code value = fsdi i.e. ('1D' PUPI cid fsdi '01 00' CRC_B)
10373-6	BCC	The one byte block checksum as described in ISO/IEC 14443-3 by Block Check Character(UID CLn check byte), Type A
10373-6	CRC	Cyclic Redundancy Check
10373-6	CRC_A	Cyclic Redundancy Check, as defined for the PICC Type A in ISO/IEC 14443-3
10373-6	CRC_B	Cyclic Redundancy Check, as defined for the PICC Type B in ISO/IEC 14443-3
10373-6	DUT	Device under test
10373-6	ESD	Electrostatic Discharge
10373-6	FWT	Frame waiting time
10373-6	FWTTEMP	Temporary frame waiting time
10373-6	Fc	Frequency of the operating field
10373-6	fcm	Frequency of the operating field during the PICC load modulation test
10373-6	Fs	Frequency of the subcarrier
10373-6	H	Field strength of the PCD antenna field
10373-6	Hmax	Maximum fieldstrength of the PCD antenna field
10373-6	Hmin	Minimum fieldstrength of the PCD antenna field
10373-6	IUT	Implementation Under Test (ISO/IEC 9646), within the scope of this document IUT represents the PCD under the test
10373-6	LT	Lower Tester (ISO/IEC 9646), the PICC-emulation part of the PCDtest-apparatus
10373-6	m	Modulation index as defined in 3.3 of ISO/IEC 14443-2:2001, 3.3
10373-6	Mute	No response within a specified timeout
10373-6	PCD	Proximity Coupling Device
10373-6	PICC	Proximity Card

10373-6	PPS(cid, dri, dsi)	Default PPS request with CID=cid, DRI=dri and DSI=dsi, i.e. ('D'+cid '11' dsi x 4 + dri CRC_A)
10373-6	R(ACK [,CID=cid] [,~CRC])n	ISO/IEC 14443-4 R(ACK) Block with block number n. The definition of the optional CID and ~CRC symbols is as described in the I(c)n block above
10373-6	R(NAK [,CID=cid][,~CRC])n	ISO/IEC 14443-4 R(NAK) Block with block number n. The definition of the optional CID and ~CRC symbols is as described in the I(c)n block above
10373-6	RATS(cid, fsdi)	Default RATS command with CID=cid and FSDI value = fsdi i.e. ('E0' fsdi x 16+cid CRC_A)
10373-6	READY(l)	READY state in cascade level l, l Î {1, 2, 3}; e.g. READY(2) is a PICC cascade level 2
10373-6	READY*(l)	READY* state in cascade level l, l Î {1, 2, 3}; e.g. READY*(2) is a PICC cascade level 2
10373-6	REQB(N)	REQB command with N as defined in ISO/IEC 14443-3:2001, 7.7.4
10373-6	S(WTX)(wtxm [,CID=cid][,~CRC])	ISO/IEC 14443-4 S(WTX) block with parameter wtxm. The definition of the optional CID and ~CRC symbols is as described in the I(c)n block above
10373-6	S(DESELECT [,CID=cid] [,~CRC])	ISO/IEC 14443-4 S(DESELECT) block. The definition of the optional CID and ~CRC symbols is as described in the I(c)n block above
10373-6	SAK(cascade)	the SELECT(l) answer with the cascade bit (bit 3) set to 1
10373-6	SAK(complete)	the SELECT(l) answer with the cascade bit (bit 3) set to 0
10373-6	SEL(c)	Select code of level c (i.e. SEL(1) = '93', SEL(2) = '95', SEL(3) = '97')
10373-6	SELECT(l)	SELECT command of cascade level l, i.e SELECT(1) = ('93 70' UIDTX1 BCC CRC_A) SELECT(2) = ('95 70' UIDTX2 BCC CRC_A) SELECT(3) = ('97 70' UIDTX3 BCC CRC_A)
10373-6	SFGI	Start-up Frame Guard Time
10373-6	SLOTMARKER(n)	Slot-MARKER command with slot number n, i.e. (16 x (n-1) + 5 CRC_B)
10373-6	t1, t2, t3	Pause A length, Pause A —Low time and Pause A rise time, as defined, respectively, in ISO/IEC 14443-2
10373-6	TB-PDU	Transmission Block Protocol Data Unit, which consists of either Iblock, R-block or S-block
10373-6	TEST_COMMAND1(1)	Default test command consisting of one unchained I-block NOTE: This command depends on the negotiated maximum frame size value of the PICC
10373-6	TEST_COMMAND1(n)k	INF field of k'th I-block chain of TEST_COMMAND1(n) NOTE: This I-block depends on the negotiated maximum frame size value of the PICC
10373-6	TEST_COMMAND1(n), n > 1	Default test command consisting of n chained I-blocks. (PCD chaining) NOTE: This command depends on the negotiated maximum frame size value of the PICC
10373-6	TEST_COMMAND2(n),	Default test command which expects a response consisting of n chained I-blocks

	n > 1	NOTE: This command depends on the negotiated maximum frame size value of the PCD.
10373-6	TEST_COMMAND3	Default test command consisting of one I-block which needs between n x FWT and (n+1) x FWT time for execution
10373-6	TEST_RESPONSE1(n)	INF field of the response to TEST_COMMAND1(n). NOTE: This response is assumed to be always unchained
10373-6	TEST_RESPONSE2(n)	Response to TEST_COMMAND2(n) NOTE: This I-block depends on the negotiated maximum frame size value of the PCD.
10373-6	TEST_RESPONSE2(n)k	INF field of k'th I-block chain of TEST_RESPONSE2(n) NOTE: This I-block depends on the negotiated maximum frame size value of the PCD.
10373-6	TEST_RESPONSE3	Response I-block to TEST_COMMAND3. NOTE: This response is always assumed to be unchained
10373-6	Test Scenario	A defined typical protocol and application-specific communication to be used with the test methods defined in this document
10373-6	TM- PDU	Test Management Protocol Data Unit (ISO/IEC 9646-1, PDU)
10373-6	tr, tf	Carrier rise and fall times as defined, respectively, in Figure 12 of ISO/IEC 14443-2
10373-6	UID	Unique Identifier, Type A
10373-6	uidn	Byte number n of Unique Identifier, n ≥ 0 UIDTXI transmitted UID 32-bit data at cascade level I (see Table 1 —Mapping from UID to UIDTX)
10373-6	UT	Upper Tester (ISO/IEC 9646), the master part of the PCD-testapparatus
10373-6	UT-APDU	Upper Tester Application Protocol Data Unit: a packet of data to be sent by the PCD to the LT through the RF interface
10373-6	VLMA	Load Modulation Amplitude
10373-6	WUPB(N)	WUPB command with N as defined in ISO/IEC 14443-3:2001, 7.7.4
10373-6	~X	Bit sequence consisting of the inverted bits of bit sequence X or any other bit sequence different from X
10373-6	X[[a..b]]	Bit subsequence of bit sequence X consisting of the bits between position a and b included. If a > b then the sequence is empty
10373-6	X[[n]]	Bit at position n of bit sequence X. First bit is at position 1
10373-6	X[n]	Byte at position n of bit sequence X. First byte is at position 1 (i.e. X[n] = X[[(n-1) x 8 + 1..n x 8]]