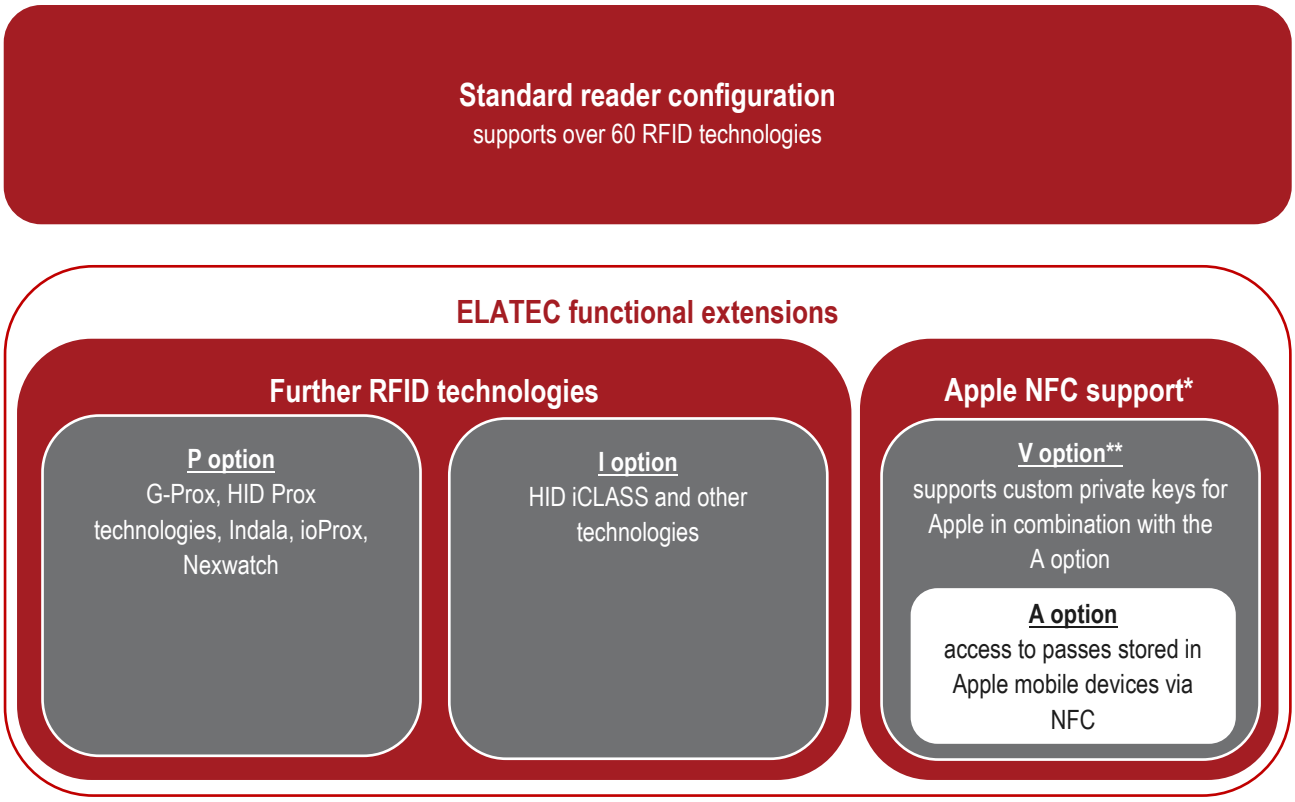
Transponder Matrix

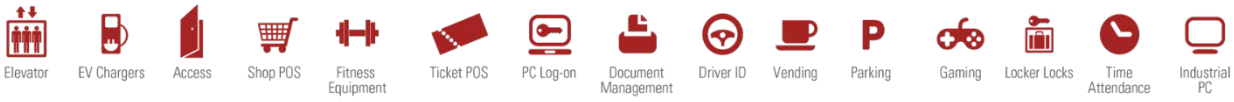
Overview of technologies supported by ELATEC RFID readers and modules



*For Apple licensees only and eligible implementers. Please contact ELATEC for details.
**The V option is only available in combination with the A option.

Unless otherwise agreed with ELATEC, each ELATEC RFID reader/module is delivered with a standard firmware version that might be older than the latest firmware developed by ELATEC. The standard firmware version of an ELATEC reader/module can be changed using the ELATEC AppBlaster tool. Alternatively, you can also download or request a specific firmware version on the ELATEC website.

This transponder matrix gives an overview of all RFID technologies supported by ELATEC RFID readers and modules running with the **firmware version 4.64**.



Overview of ELATEC product families of RFID readers/modules

Devices with NXP frontend

TWN4 MultiTech 2 series	LF	HF / NFC	BLE	SAM slot(s)	HID iCLASS SE processor**	Frontend
TWN4 MultiTech 2	●	●	●	1 to 2***	Plugged in	PN5180
TWN4 MultiTech 2 HF		●		1	Plugged in	PN5180
TWN4 MultiTech 2 HF PCSC		●		1	Plugged in	PN5180
TWN4 MultiTech 2 LF HF	●	●		2	Plugged in	PN5180
TWN4 MultiTech 2 LF*	●			1	n/a	PN5180
TWN4 MultiTech 2 M	●	●	●	1 to 2***	Plugged in	PN5180
TWN4 MultiTech 2 M HF		●		1	Plugged in	PN5180
TWN4 MultiTech 2 M LF HF	●	●		2	Plugged in	PN5180
TWN4 MultiTech 2 M LF*	●			1	n/a	PN5180
TWN4 MultiTech 3 series						
TWN4 MultiTech 3 M	●	●	●	1	Plugged in	PN5180
TWN4 MultiTech 3 M LF HF	●	●		1	Plugged in	PN5180
TWN4 MultiTech 3 M LF*	●			1	n/a	PN5180
TWN4 MultiTech Mini series						
TWN4 MultiTech HF Mini		●		0	Plugged in	PN512
TWN4 MultiTech Nano series						
TWN4 MultiTech Nano M	●	●		0	Plugged in	PN5180
TWN4 MultiTech series						
TWN4 MultiTech*	●	●		2	Plugged in	PN512
TWN4 MultiTech M*	●	●		2	Plugged in	PN512
TWN4 MultiTech SmartCard series						
TWN4 MultiTech SmartCard*	●	●		2	Plugged in	PN512
TWN4 Palon Compact series						
TWN4 Palon Compact M	●	●	●	1	Plugged in	PN5180
TWN4 Palon Compact M Light	●	●		1	Plugged in	PN5180
TWN4 Palon Compact Panel	●	●	●	1	Plugged in	PN5180
TWN4 Palon Compact Panel Light	●	●		1	Plugged in	PN5180
TWN4 Palon Compact Wall	●	●	●	1	Plugged in	PN5180
TWN4 Palon Compact Wall Light	●	●		1	Plugged in	PN5180
TWN4 Palon Square series						
TWN4 Palon Square M LF HF	●	●		2	Plugged in	PN5180
TWN4 Slim series						
TWN4 Slim	●	●	●	1	Embedded or plugged in	PN5180
TWN4 Slim JP		●	●	1		PN5180
TWN4 USB Front Reader series						
TWN4 USB Front Reader	●	●	●	1	Plugged in	PN5180

*EOL: These products have been discontinued. Please refer to the corresponding Product Discontinuation Notifications (PDN) at www.elatec-rfid.com/int/elatec-end-of-lifecycle-products for more information.

**Optional (relevant for product configuration with PI options only).

***Devices equipped with a BLE module of 1st generation have two free SAM slots, whereas devices equipped with a BLE module of 2nd generation only have one free SAM slot.

Devices with LEGIC frontend

TWN4 MultiTech 2 LEGIC series	LF	HF / NFC	BLE	SAM slot(s)	HID iCLASS SE processor**	Frontend
TWN4 MultiTech 2 LEGIC	●	●	●	1	Plugged in	SM-4200***
TWN4 MultiTech 2 LEGIC LF HF	●	●		2	Plugged in	SM-4200***
TWN4 MultiTech 2 LEGIC M	●	●	●	1	Plugged in	SM-4200***
TWN4 MultiTech 2 LEGIC M LF HF	●	●		2	Plugged in	SM-4200***
TWN4 MultiTech 3 LEGIC series						
TWN4 MultiTech 3 LEGIC M	●	●	●	1	n/a	SM-4200
TWN4 MultiTech 3 LEGIC M LF HF	●	●		1	n/a	SM-4200
TWN4 MultiTech LEGIC series						
TWN4 MultiTech LEGIC*	●	●		2	n/a	SM-4200***
TWN4 MultiTech LEGIC M*	●	●		2	n/a	SM-4200***
TWN4 MultiTech Nano LEGIC series						
TWN4 MultiTech Nano LEGIC 42 M	●	●		0	n/a	SM-4200
TWN4 MultiTech Nano LEGIC 63 M	●	●	●	0	n/a	SM-6300
TWN4 MultiTech SmartCard LEGIC series						
TWN4 MultiTech SmartCard LEGIC 42*	●	●		2	n/a	SM-4200
TWN4 MultiTech SmartCard LEGIC M*	●	●		2	n/a	SM-4200
TWN4 Palon Compact LEGIC series						
TWN4 Palon Compact LEGIC M	●	●	●	1	n/a	SM-4200
TWN4 Palon Compact LEGIC M Light	●	●		1	n/a	SM-4200
TWN4 Palon Compact LEGIC Panel	●	●	●	1	n/a	SM-4200
TWN4 Palon Compact LEGIC Panel Light	●	●		1	n/a	SM-4200
TWN4 Palon Compact LEGIC Wall	●	●	●	1	n/a	SM-4200
TWN4 Palon Compact LEGIC Wall Light	●	●		1	n/a	SM-4200
TWN4 Palon One LEGIC series						
TWN4 Palon One LEGIC M LF HF*	●	●		1	n/a	SM-4200
TWN4 Slim LEGIC series						
TWN4 Slim LEGIC	●	●	●	1	n/a	SM-6300
TWN4 USB Front Reader LEGIC series						
TWN4 USB Front Reader LEGIC	●	●	●	1	n/a	SM-4200

*EOL: These products have been discontinued. Please refer to the corresponding Product Discontinuation Notifications (PDN) at www.elatec-rfid.com/int/elatec-end-of-lifecycle-products for more information.

**Optional (relevant for product configuration with PI options only).

***Product derivates with LEGIC SM-4500 frontend are available on request.

ELATEC multi-frequency RFID readers/modules (LF/HF)

			All multi-frequency readers/modules of the following series: **Devices with NXP frontend** TWN4 MultiTech, TWN4 MultiTech 2, TWN4 MultiTech 3, TWN4 MultiTech Nano, TWN4 MultiTech SmartCard, TWN4 Palon Compact, TWN4 Palon Square, TWN4 Slim, TWN4 USB Front Reader			All multi-frequency readers/modules of the following series: **Devices with LEGIC frontend** TWN4 MultiTech 2 LEGIC, TWN4 MultiTech 3 LEGIC, TWN4 MultiTech LEGIC, TWN4 MultiTech Nano LEGIC, TWN4 MultiTech SmartCard LEGIC, TWN4 Palon Compact LEGIC, TWN4 Palon One LEGIC, TWN4 Slim LEGIC, TWN4 USB Front Reader LEGIC		
			standard	P option	PI options[1]	standard	P option	PI options[1,4]
13.56 MHz (HF)	ISO 14443A	HID MIFARE Classic SE			●			●
		HID MIFARE DESFire SE			●			●
		HID SEOS			●			●
		LEGIC Advant	UID only	UID only	UID only	●	●	●
		NTAG2xx	●	●	●	●	●	●
		NXP MIFARE Classic	●	●	●	●	●	●
		NXP MIFARE Classic EV1	r/w enhanced security features on request	r/w enhanced security features on request	r/w enhanced security features on request	r/w enhanced security features on request	r/w enhanced security features on request	r/w enhanced security features on request
		NXP MIFARE DESFire EV1	●	●	●	●	●	●
		NXP MIFARE DESFire EV2/EV3	Supported as part of the EV1 downward compatibility	Supported as part of the EV1 downward compatibility	Supported as part of the EV1 downward compatibility	Supported as part of the EV1 downward compatibility	Supported as part of the EV1 downward compatibility	Supported as part of the EV1 downward compatibility
		NXP MIFARE DESFire Light	Supported as part of the EV1 downward compatibility	Supported as part of the EV1 downward compatibility	Supported as part of the EV1 downward compatibility	Supported as part of the EV1 downward compatibility	Supported as part of the EV1 downward compatibility	Supported as part of the EV1 downward compatibility
		NXP MIFARE Mini	●	●	●	●	●	●
		NXP MIFARE Plus S	●	●	●	●	●	●
		NXP MIFARE Plus X	●	●	●	●	●	●
		NXP MIFARE Smart MX	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		NXP MIFARE Ultralight	●	●	●	●	●	●
		NXP MIFARE Ultralight C	●	●	●	●	●	●
		NXP MIFARE Ultralight EV1	r/w enhanced security features on request	r/w enhanced security features on request	r/w enhanced security features on request	r/w enhanced security features on request	r/w enhanced security features on request	r/w enhanced security features on request
		SLE44R35	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		SLE66Rxx (my d-move)	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		Topaz	●	●	●			●
	ISO 14443B	Calypso	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		Calypso Innovatron protocol	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode			r/w in transparent data exchange mode
		CEPAS	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		CTS	●	●	●			●
		Pico Pass	UID only	UID only	UID only	UID only	UID only	UID only
		SRI4K	●	●	●			●
		SRI512	●	●	●			●
		SRIX4K	●	●	●			●
		SRT512	●	●	●			●
	ISO 15693	EM4x33	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		EM4x35	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		HID iCLASS Legacy/SR/SE			●			●
		ICODE SLI	●	●	●	●	●	●
		LEGIC Advant	UID only	UID only	UID only	●	●	●
		M24LR16/64	●	●	●	●	●	●
		MB89R118/119	[2]	[2]	[2]			●
		Pico Pass	UID only	UID only	UID only	UID only	UID only	UID only
		SRF55Vxx (my d-vicinity)	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		Tag-it	●	●	●	●	●	●
	ISO 18092 / ECMA-340	NFC Forum Tag type 1	●	●	●			●
		NFC Forum Tag type 2	●	●	●	●	●	●
		NFC Forum Tag type 3	●	●	●	●	●	●
		NFC Forum Tag type 4	●	●	●	●	●	●
		NFC Forum Tag type 5	●	●	●	●	●	●
		Sony FeliCa	UID + r/w public area	UID + r/w public area	UID + r/w public area	UID + r/w public area	UID + r/w public area	UID + r/w public area
		LEAF	AV2 only, requires one free SAM slot for MIFARE SAM AV2 card	AV2 only, requires one free SAM slot for MIFARE SAM AV2 card	AV2 only, requires one free SAM slot for MIFARE SAM AV2 card[3]	AV2 only, requires one free SAM slot for MIFARE SAM AV2 card	AV2 only, requires one free SAM slot for MIFARE SAM AV2 card	AV2 only, requires one free SAM slot for MIFARE SAM AV2 card[3]
		LEGIC Prime				●	●	●

1)Requires one free SAM slot for HID iCLASS SE processor.
2)Not supported by TWN4 MultiTech, TWN4 MultiTech SmartCard and TWN4 USB Front Reader series.
3)Some ELATEC readers/modules have one free SAM slot only and cannot support LEAF and the I option at the same time. Refer to the respective product data sheets or to the overview above for more information.
4)Only available with readers/modules of the TWN4 MultiTech 2 LEGIC series.

ELATEC multi-frequency RFID readers/modules (LF/HF)

		All multi-frequency readers/modules of the following series: **Devices with NXP frontend** TWN4 MultiTech, TWN4 MultiTech 2, TWN4 MultiTech 3, TWN4 MultiTech Nano, TWN4 MultiTech SmartCard, TWN4 Palon Compact, TWN4 Palon Square, TWN4 Slim, TWN4 USB Front Reader			All multi-frequency readers/modules of the following series: **Devices with LEGIC frontend** TWN4 MultiTech 2 LEGIC, TWN4 MultiTech 3 LEGIC, TWN4 MultiTech LEGIC, TWN4 MultiTech Nano LEGIC, TWN4 MultiTech SmartCard LEGIC, TWN4 Palon Compact LEGIC, TWN4 Palon One LEGIC, TWN4 Slim LEGIC, TWN4 USB Front Reader LEGIC		
		standard	P option	PI options[1)]	standard	P option	PI options[1)2)]
125 kHz** (LF)	AWID	●	●	●	●	●	●
	Cardax	Hash value only	Hash value only	Hash value only	Hash value only	Hash value only	Hash value only
	CASI-RUSCO	●	●	●	●	●	●
	Deister	Hash value only	Hash value only	Hash value only	Hash value only	Hash value only	Hash value only
	EM4050	●	●	●	●	●	●
	EM4100	●	●	●	●	●	●
	EM4102	●	●	●	●	●	●
	EM4150	●	●	●	●	●	●
	EM4200	only emulation of 4100/4102	only emulation of 4100/4102	only emulation of 4100/4102	only emulation of 4100/4102	only emulation of 4100/4102	only emulation of 4100/4102
	EM4305	●	●	●	●	●	●
	EM4450	●	●	●	●	●	●
	EM4550	●	●	●	●	●	●
	G-Prox		Hash value only	Hash value only		Hash value only	Hash value only
	HID 1326 Prox II		●	●		●	●
	HID 1336 DuoProx II		●	●		●	●
	HID 1346 ProxKey III		●	●		●	●
	HID 1386 ISO Prox II		●	●		●	●
	HID 1391 Micro Prox		●	●		●	●
	HID Prox		●	●		●	●
	HITAG 1/2/S	Without encryption	Without encryption	Without encryption	Without encryption	Without encryption	Without encryption
	ICT	●	●	●	●	●	●
	IDTECK	●	●	●	●	●	●
	Indala		●	●		●	●
	ioProx		●	●		●	●
	ISONAS	●	●	●	●	●	●
	Keri	●	●	●	●	●	●
	Miro	●	●	●	●	●	●
	Nedap	Hash value only	Hash value only	Hash value only	Hash value only	Hash value only	Hash value only
	Nexwatch		●	●		●	●
	Pyramid	●	●	●	●	●	●
	Q5	●	●	●	●	●	●
	T5557	●	●	●	●	●	●
	T5567	●	●	●	●	●	●
	T5577	●	●	●	●	●	●
	TITAN (EM4050)	●	●	●	●	●	●
	UltraProx	●	●	●	●	●	●
	UNIQUE	●	●	●	●	●	●
	ZODIAC	●	●	●	●	●	●

1)Requires one free SAM slot for HID iCLASS SE processor.
2)Only available with readers/modules of the TWN4 MultiTech 2 LEGIC series.

**125 kHz technologies require a local test and import license from the Russian Ministry of Trade and Industry (MINPROMTORC). This license has to be in place before ELATEC can accept any order to be shipped to Russia.

ELATEC single-frequency RFID readers/modules (HF)

			TWN4 MultiTech 2 HF TWN4 MultiTech 2 HF PCSC TWN4 MultiTech 2 M HF TWN4 MultiTech HF Mini TWN4 Slim JP	
			standard	I option[1]
13.56 MHz (HF)	ISO 14443A	HID MIFARE Classic SE		●
		HID MIFARE DESFire SE		●
		HID SEOS		●
		LEGIC Advant	UID only	UID only
		NTAG2xx	●	●
		NXP MIFARE Classic	●	●
		NXP MIFARE Classic EV1	r/w enhanced security features on request	r/w enhanced security features on request
		NXP MIFARE DESFire EV1	●	●
		NXP MIFARE DESFire EV2/EV3	supported as part of the EV1 downward compatibility	supported as part of the EV1 downward compatibility
		NXP MIFARE DESFire Light	supported as part of the EV1 downward compatibility	supported as part of the EV1 downward compatibility
		NXP MIFARE Mini	●	●
		NXP MIFARE Plus S	●	●
		NXP MIFARE Plus X	●	●
		NXP MIFARE Smart MX	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		NXP MIFARE Ultralight	●	●
		NXP MIFARE Ultralight C	●	●
		NXP MIFARE Ultralight EV1	r/w enhanced security features on request	r/w enhanced security features on request
		SLE44R35	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		SLE66Rxx (my d-move)	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		Topaz	●	●
	ISO 14443B	Calypso	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		Calypso Innovatron protocol	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		CEPAS	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		CTS	●	●
		Pico Pass	UID only	UID only
		SRI4K	●	●
		SRI512	●	●
		SRIX4K	●	●
		SRT512	●	●
	ISO 15693	EM4x33	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		EM4x35	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		HID iCLASS Legacy/SR/SE		●
		ICODE SLI	●	●
		LEGIC Advant	UID only	UID only
		M24LR16/64	●	●
		MB89R118/119	[2]	[2]
		Pico Pass	UID only	UID only
		SRF55Vxx (my d-vicinity)	r/w in transparent data exchange mode	r/w in transparent data exchange mode
		Tag-it	●	●
	ISO 18092 / ECMA-340	NFC Forum Tag type 1	●	●
		NFC Forum Tag type 2	●	●
		NFC Forum Tag type 3	●	●
		NFC Forum Tag type 4	●	●
		NFC Forum Tag type 5	●	●
		Sony FeliCa	UID + read/write public area	UID + read/write public area
		LEAF	AV2 only, requires one free SAM slot for MIFARE SAM AV2 card	AV2 only, requires one free SAM slot for MIFARE SAM AV2 card[3]
		LEGIC Prime		

1)Requires one free SAM slot for HID iCLASS SE processor.
2)Supported, except by TWN4 MultiTech HF Mini.
3)Some ELATEC readers/modules have one free SAM slot only and cannot support LEAF and the I option at the same time. Refer to the respective product data sheets or to the overview above for more information.

ELATEC single-frequency RFID readers/modules (LF)

		TWN4 MultiTech 2 LF TWN4 MultiTech 2 M LF TWN4 MultiTech 3 M LF	
		standard	P option
125 kHz** (LF)	AWID	●	●
	Cardax	Hash value only	Hash value only
	CASI-RUSCO	●	●
	Deister	Hash value only	Hash value only
	EM4050	●	●
	EM4100	●	●
	EM4102	●	●
	EM4150	●	●
	EM4200	Only emulation of 4100/4102	Only emulation of 4100/4102
	EM4305	●	●
	EM4450	●	●
	EM4550	●	●
	G-Prox		Hash value only
	HID 1326 Prox II		●
	HID 1336 DuoProx II		●
	HID 1346 ProxKey III		●
	HID 1386 ISO Prox II		●
	HID 1391 Micro Prox		●
	HID Prox		●
	HITAG 1/2/S	Without encryption	Without encryption
	ICT	●	●
	IDTECK	●	●
	Indala		●
	ioProx		●
	ISONAS	●	●
	Keri	●	●
	Miro	●	●
	Nedap	Hash value only	Hash value only
	Nexwatch		●
	Pyramid	●	●
	Q5	●	●
	T5557	●	●
	T5567	●	●
	T5577	●	●
	TITAN (EM4050)	●	●
	UltraProx	●	●
	UNIQUE	●	●
	ZODIAC	●	●

**125 kHz technologies require a local test and import license from the Russian Ministry of Trade and Industry (MINPROMTORC). This license has to be in place before ELATEC can accept any order to be shipped to Russia.

Apple technologies supported by ELATEC RFID readers/modules*

	Apple Value Added Services (VAS)**	Apple Access passes***
TWN4 MultiTech	•	•
TWN4 MultiTech M	•	
TWN4 MultiTech 2	•	•
TWN4 MultiTech 2 M	•	
TWN4 MultiTech 2 LF HF	•	•
TWN4 MultiTech 2 M LF HF	•	
TWN4 MultiTech 2 HF	•	
TWN4 MultiTech 2 M HF	•	
TWN4 MultiTech 3 M	•	
TWN4 MultiTech 3 M LF HF	•	
TWN4 MultiTech Nano M	•	
TWN4 Palon Compact M	•	
TWN4 Palon Compact M Light	•	
TWN4 Palon Compact Panel	•	
TWN4 Palon Compact Panel Light	•	
TWN4 Palon Compact Wall	•	
TWN4 Palon Compact Wall Light	•	
TWN4 Palon Square M LF HF	•	
TWN4 Slim	•	
TWN4 USB Front Reader	•	
TWN4 Mini EVP M HF	•	

Apple VAS and Access passes both include the Enhanced Contactless Protocol (ECP) 2.0.

*For Apple licensees only and eligible implementers. Please contact ELATEC for details.
**Requires the ELATEC AV options.
***Requires the ELATEC A option.

Please note:

Apple VAS and Access passes can be tested on request on other ELATEC RFID readers/modules of the TWN4 family. For best convenience reasons and best performance, no other RFID technology (LF, HF) should be enabled in parallel to Apple technologies. For system integrators and PCB module design-in, Apple may require additional testing and proof that the final product meets all Apple requirements for VAS and Access passes.

Appendix

Terminology

Term	Explanation
(Apple) Access pass	Contactless NFC passes can be stored in an Apple mobile device (iOS). ELATEC uses the term “Access pass” for this type of passes. Access passes are stored in a secure environment on iOS devices. There are different storage formats of Access passes. ELATEC readers with Access pass support also use the underlying ECP 2.0 protocol. Access passes must not be confused with VAS passes.
ECP / ECP 2.0	Stands for “Enhanced Contactless Polling” protocol. ECP is a low-level contactless protocol defined by Apple, extending parts of the ISO 14443 specifications, to ensure best performance when detecting Apple mobile devices using NFC.
RFID reader/module	For ELATEC products, the term “RFID module” refers to OEM PCBs, i.e. the bare electronic board. These devices are intended to be integrated into a final (host) product by system integrators and device vendors. The term “RFID reader” is used for final devices, i.e. including a housing, connectors and / or cabling, and of course an RFID module.
Transponder	The term “transponder” is an association of “**trans**mitter” and “res**ponder**”. “RFID tag” and “RFID label” are common synonyms used for “transponder”. Basically, an RFID transponder consists of a chip that contains information transmitted to an RFID reader through electromagnetic waves. A transponder can have different forms, like a card, a key fob or even a smartphone. The term “transponder” can also refer to any type of contactless-enabled smart cards.
VAS	Stands for “Value-Added Services”. Apple VAS is an Apple wallet solution for many loyalty use-cases. Users can load so-called VAS passes into their wallet on their mobile devices (iOS). Most can be read visually (barcode, QR code). NFC-based VAS passes are available as well. Readers with VAS support can read these VAS passes. Technically, the ECP 2.0 protocol is used when reading VAS passes.

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