

Callidus

UHF RFID products



Contacts:

CEO:

Mr. Radim Hotovec

E: radim.hotovec@callidus.cz

P: +420 777 701 691

**Callidus research and development department
head (IT and electronics):**

Mr. Stanislav Včelka

E: stanislav.vcelka@callidus.cz

P: +420 777 701 698

Callidus products support:

Mr. Milan Řezníček

E: milan.reznicek@callidus.cz

P: +420 773 799 883

Senior design engineer

Mr. František Honek

E: frantisek.honek@callidus.cz

P: +420 773 601 691

Content

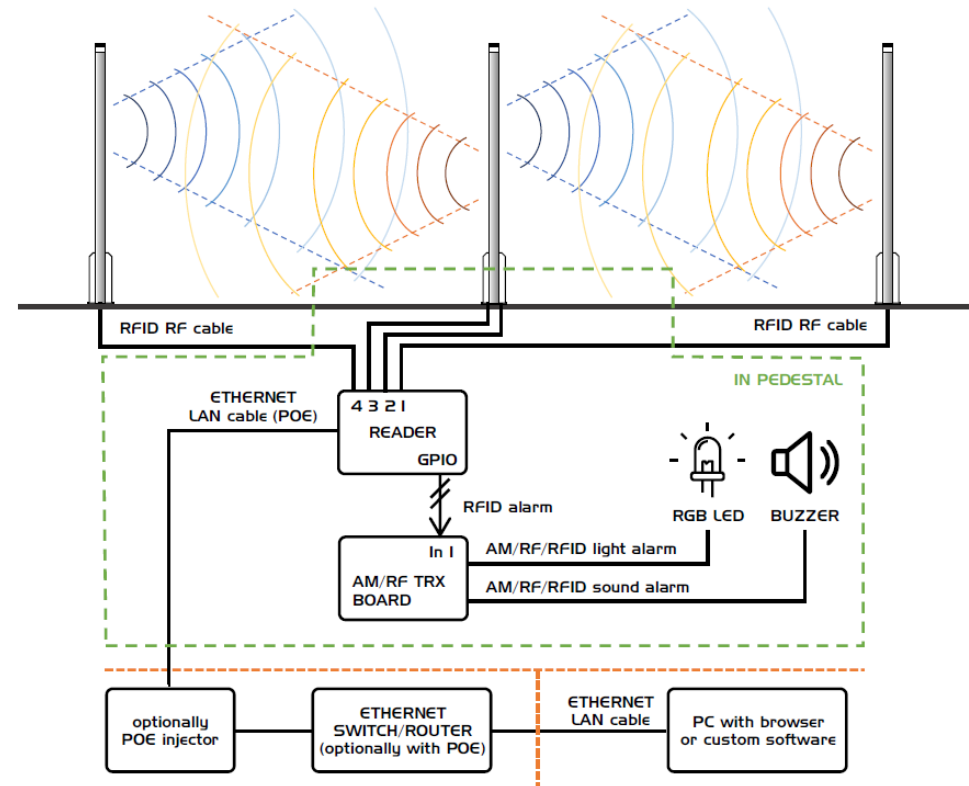
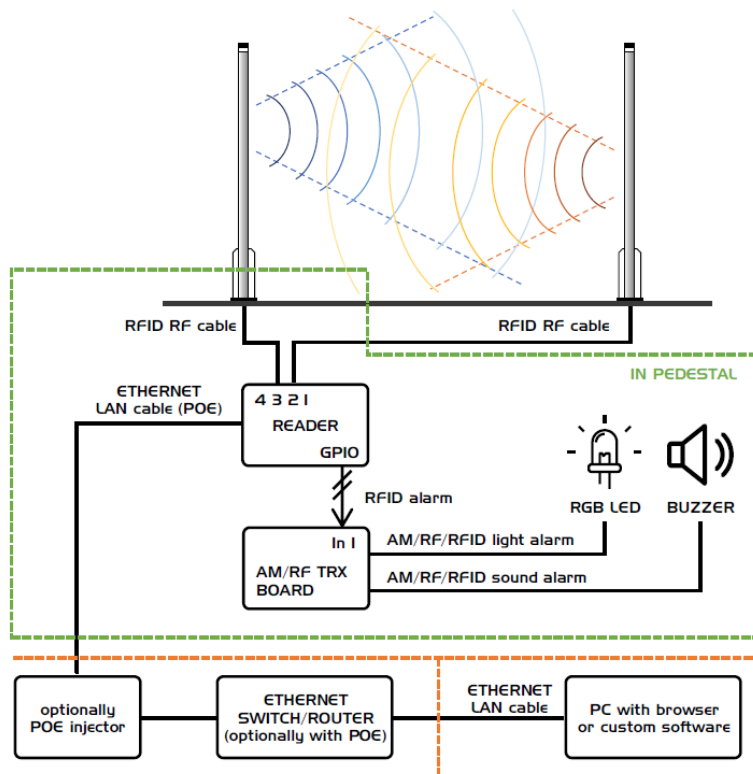
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I UHF RFID technology

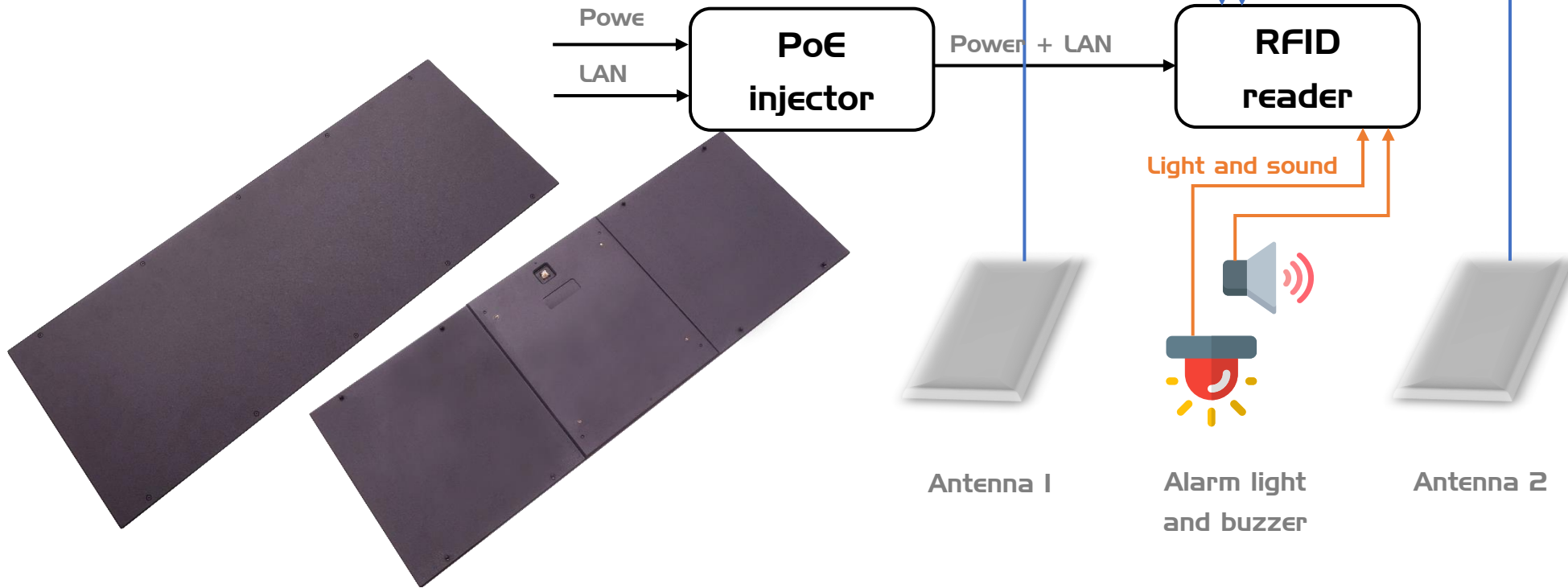
- Unique concept of complete inhouse development
- Usage of worldwide best UHF RFID reading IMPINJ modules
- Possible UHF RFID readers optional customization
- Unique inhouse research, development and production capabilities of UHF RFID antennae, such a

II UHF RFID antennae for integration into EAS pedestals



I.2 UHF RFID antennae

I.2.1 UHF RFID ceiling antenna



I.2.1.1 RFID reader is powered over Ethernet cable (injector is not needed if router has PoE feature)

I.2.1.2 Alarm is indicated by light and buzzer which is connected to RFID reader

I.2.1.3 Antennas are connected to RFID reader via coaxial cable

Datasheet of the UHF RFID ceiling antenna

PRODUCT FEATURES

- UHF RFID ceiling antenna
- Set of 1.5 meter mounting lanyards included
- VESA holder mount (not included)

AVAILABLE ACCESSORIES

- RFID Reader
- VESA holder (200x200 mm)

CONNECTIVITY

- SMA - female

MECHANICAL

Width	29.5 cm (11.6 in)
Length	80.0 cm (31.5 in)
Thickness	1.5 cm (0.6 in)
Weight	3 kg

ELECTRICAL

	EU (ETSI)	US (FCC)
Operating frequency	865-868 MHz	902-928 MHz
Gain	12 dBiC	12 dBiC
Polarization	circular	circular
Front to Back ratio	> 25 dB	> 25 dB
Main to Side lobe ratio	> 13 dB	> 10 dB
Axial ratio	2 dB typically	2 dB typically
3dB elevation beamwidth	23°	23°
3dB azimuth beamwidth	80°	80°
Input impedance	50 Ω	50 Ω
VSWR / return loss	1.3 typically	1.5 typically

READING DISTANCE

for UHF RFID labels/tags

Up to 500 cm (16.4 ft), depending on multiple factors as position, presence of metals or objects filled with liquid, used tags, power and more.

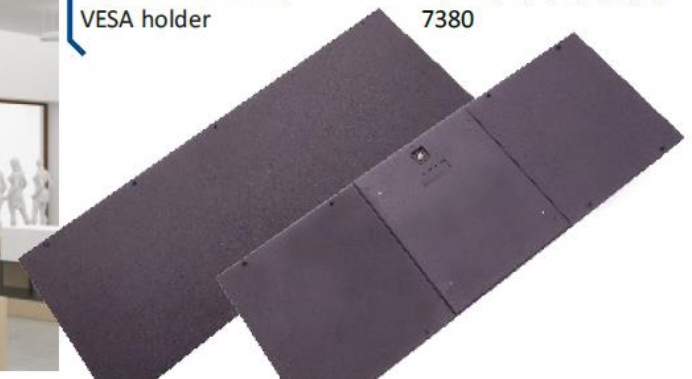
ENVIRONMENTAL

Ambient temperature	0-35°C (equipment for normal indoor use)
Relative humidity	0-90% (non-condensing)

PRODUCT ORDER CODES

Callidus ceiling RFID antenna		
EU (ETSI) version	- black	18-072.EUB
	- white	18-072.EUW
US (FCC) version	- black	18-072.USB
	- white	18-072.USW

8 port UHF RFID reader Gen2	18-333
Reader - antenna cable (1 - 7 m after 1 m)	21-000-504.x (x = 1; 2; 3; 4; 5; 6; 7)
VESA holder	7380



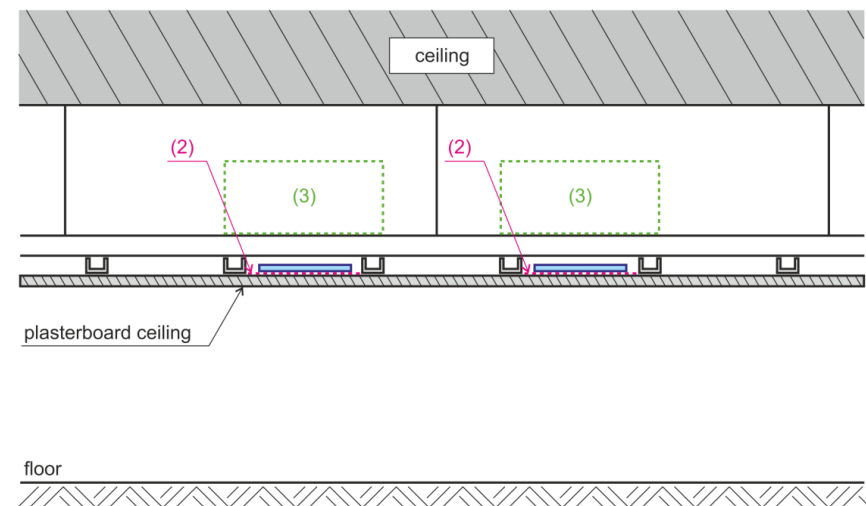
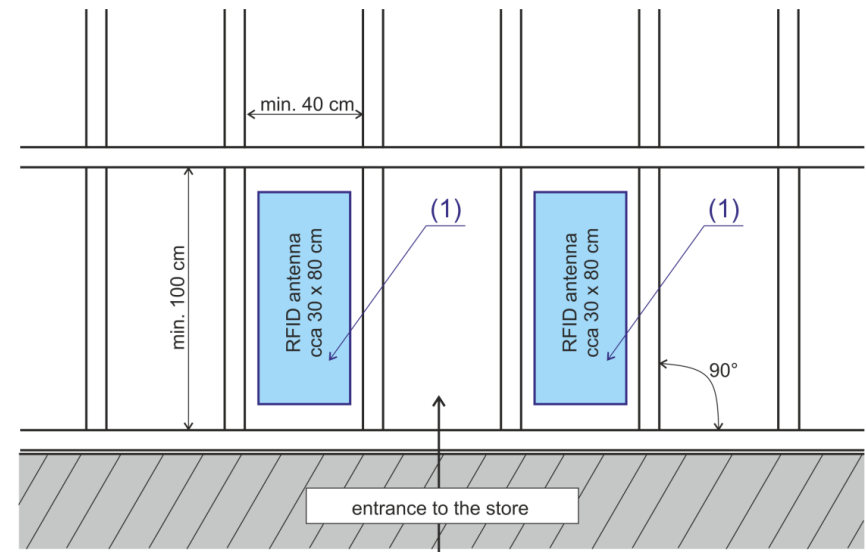
Hidden ceiling RFID antenna solution

Spacing of supporting and mounting profiles has to be approx. 100-120cm x 40-50 cm (see the picture), as recommended by many manufacturers of the plasterboard ceiling systems. Remember, for good function the antenna has to be placed **perpendicularly** to the store entrance (see the picture) and **not** on metal objects.

Ad 1) - RFID antenna

Ad 2) - Area under the RFID antenna. There must not be anything conductive or metallized (a vapor-permeable foil etc.) on this surface.

Ad 3) - Area above the RFID antenna. Metal objects are allowed in this area, but keep this space as free as possible.



I.2.2 UHF RFID 240x240 panel antenna

PRODUCT FEATURES

- UHF RFID antenna, LHCP
- Very low VSWR in all frequency range
- VESA holder mount 100x100 (VESA not included)

AVAILABLE ACCESSORIES

- RFID Reader
- VESA holder

CONNECTIVITY

- TNC - female

MECHANICAL

Width	24.5 cm (9.65 in)
Length	24.5 cm (9.65 in)
Thickness	3 cm (1.18 in)
Weight	0.81 kg

ELECTRICAL

	EU (ETSI)	US (FCC)
Operating frequency	865-868 MHz	902-928 MHz
Gain	8.5 dBiC	8.5 dBiC
Polarization	circular	circular
Front to Back ratio	> 20 dB	> 20 dB
Axial ratio	2 dB typically	2 dB typically
3dB elevation beamwidth	70°	70°
3dB azimuth beamwidth	70°	70°
Input impedance	50 Ω	50 Ω
VSWR / return loss	1.3 typically	1.4 typically

READING DISTANCE

for UHF RFID labels/tags

Up to 800 cm (26.2 ft), depending on multiple factors as position, presence of metals or objects filled with liquid, used tags, power and more.

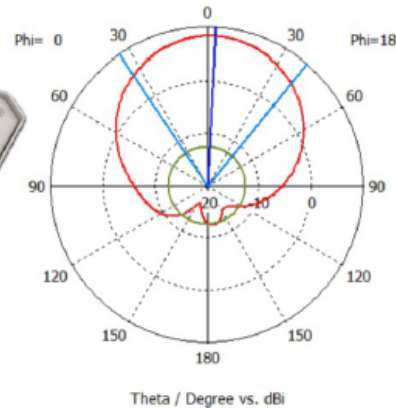
ENVIRONMENTAL

Ambient temperature	0-35°C (equipment for normal indoor use)
Relative humidity	0-90% (non-condensing)

PRODUCT ORDER CODES

Callidus RFID 240x240 panel antenna	
EU (ETSI) version, LHCP, white	18-361.TE UW
EU (ETSI) version, LHCP, black	18-361.TE UB
US (FCC) version, LHCP, white	18-361.TU SW
US (FCC) version, LHCP, black	18-361.TU SB

8 port UHF RFID reader Gen2	18-333
Reader - antenna cable (1 - 7 m after 1 m)	n/a



I.2.3 UHF RFID floor antenna

PRODUCT FEATURES

- UHF RFID antenna designed for placement inside a poured concrete floor
- The maximum reading distance depends on the thickness of the floor layer above the antenna and is Inversely proportional to it
- No metal reinforcement shall be used in the floor layer above the antenna for this antenna to function properly
- Possibility of combination with floor AM TRX EAS system

CONNECTIVITY

- SMA - female

AVAILABLE ACCESSORIES

- RFID Reader

MECHANICAL

Width	51 cm (20.1 in)
Length	38 cm (15 in)
Thickness	1.9 cm (0.75 in)
Weight	3.25 kg

READING DISTANCE

for UHF RFID labels/tags	Up to 2m (78.7 in) (depending on multiple factors as floor thickness, set transmit power, GEN2 settings, used tags)
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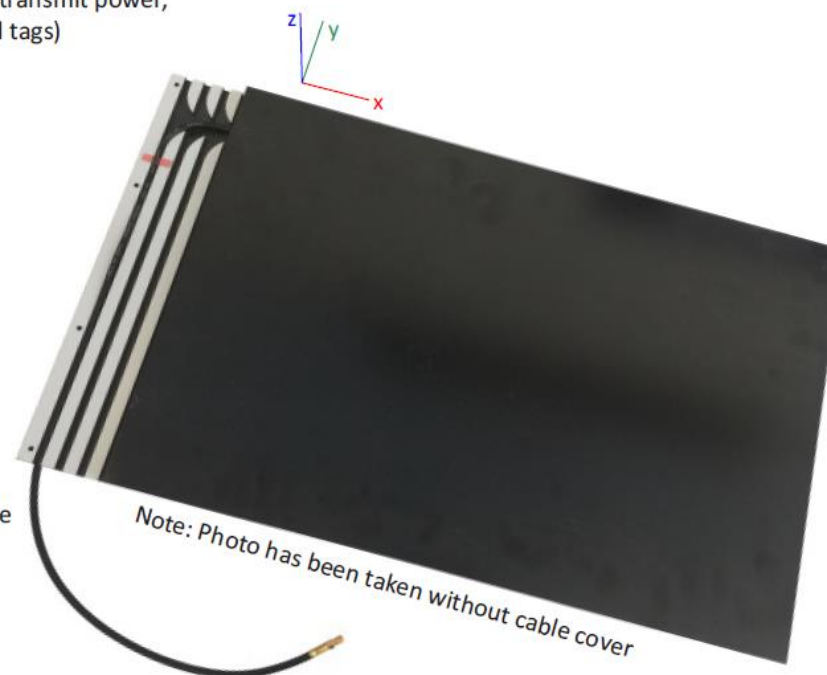
ELECTRICAL

Operating frequency EU (ETSI)	865-868 MHz
Operating frequency US (FCC)	902-928 MHz
Gain for 40 mm concrete thickness above the antenna	4 dBiC
Polarization	circular
3dB beamwidth in axle XZ	65°
3dB beamwidth in axle YZ	75°
Input impedance	50 Ω
VSWR / return loss	1.4 typically

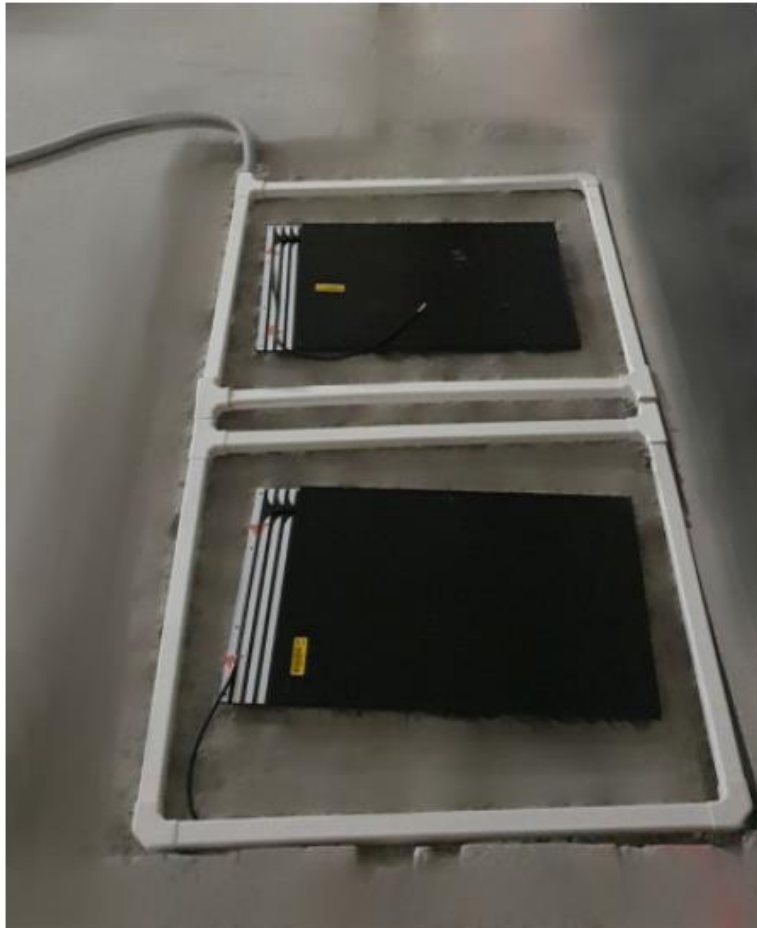
Recommended thickness of the floor layer above the antenna	40 - 50 mm concrete
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ENVIRONMENTAL

Ambient temperature	0-35°C (equipment for normal indoor use)
Relative humidity	0-90% (non-condensing)



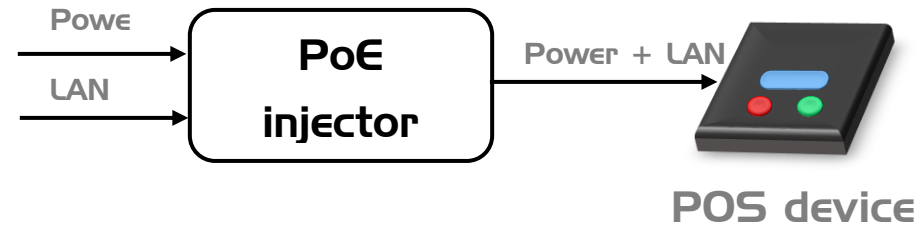
Example of use with floor AM TRX concealed EAS system



PRODUCT ORDER CODES

Callidus floor UHF RFID antenna	
EU version (ETSI)	21-501.EU (R1)
US version (FCC)	21-501.US (R1)
8 port UHF RFID reader Gen2	18-333
AM TRX 166x74 U4 concealed EAS system	17-530.U4
AM TRX 130x74 U4 concealed EAS system	17-535.U4
AM TRX 166x74 U15 concealed EAS system	17-550.U15
AM TRX 130x74 U15 concealed EAS system	17-555.U15
Callidus AM TRX controller	19-011.CEU (.CUS, .CUK)
Callidus AM TRX controller with UL PSU	19-014.CEU (.CUS, .CUK)

I.3 UHF RFID POS solution



I.3.1 POS device is connected only with one cable, Ethernet cable with PoE



Datasheet of UHF RFID POS solution

PRODUCT FEATURES

- Activates and Deactivates RFID tags/labels

CONNECTIVITY

- LAN 10/100Mbit Ethernet, IPv4
DHCP or static IP
2 m (78.7 in) cable length

USER INTERFACE

- Activation button (red button)
- Deactivation button (green button)
- Optical indicator (RGB LED)
- Sound indicator (internal buzzer)

SOFTWARE INTERFACE

- RFID API Callidus REST API

COMPATIBILITY

- UHF RFID tags/labels



MECHANICAL

Width	22 cm (8.66 in)
Length	30 cm (11.81 in)
Height	4.8 cm (1.89 in)
Weight	1.8 kg

De/activation DISTANCE for UHF RFID tags/labels

up to 50 cm (1.64 ft), depending on multiple factors as position, presence of metals or objects filled with liquid, used tags, antenna gain and more

ELECTRICAL

Operating frequency (ETSI)	865 - 868 MHz
Operating frequency (FCC)	902 - 928 MHz
RFID protocol support	Gen2
Reading speed	Up to 750 tags/sec
Editing speed	Up to 5 tags/sec
Editing distance	Up to 1m (depending on multiple factors as set transmit power, GEN2 settings, used tags, and more)
Transmit power	Adjustable from -10 dBm to +30 dBm in 1 dBm steps
Power over Ethernet (PoE)	PoE 802.3 af
Power consumption	max. 12W

ENVIRONMENTAL

Ambient temperature	0 - 35°C (equipment for normal indoor use)
Relative humidity	0 - 90% (non-condensing)

PRODUCT ORDER CODES

UHF RFID POS solution	
EU version (ETSI)	21-305.EU
US version (FCC)	21-305.US

Datasheet of UHF RFID POS solution Gen2

PRODUCT FEATURES

- Continuously activates and deactivates RFID tags/labels

CONNECTIVITY

- LAN 10/100Mbit Ethernet, IPv4
DHCP or static IP
2 m (78.7 in) cable length

USER INTERFACE

- Key switch (3 positions: activation/deactivation/disabled)
- Sound indicator (internal buzzer)

SOFTWARE INTERFACE

- RFID API Callidus REST API

COMPATIBILITY

- UHF RFID tags/labels



MECHANICAL

Width	23 cm (9 in)
Length	37 cm (14.6 in)
Height	3.4 cm (1.34 in)
Weight	1.6 kg

De/activation DISTANCE for UHF RFID tags/labels

up to 50 cm (1.64 ft), depending on multiple factors as position, presence of metals or objects filled with liquid, used tags, antenna gain and more

ELECTRICAL

Operating frequency (ETSI)	865 - 868 MHZ
Operating frequency (FCC)	902 - 928 MHZ
RFID protocol support	Gen2
Reading speed	Up to 750 tags/sec
Editing speed	Up to 5 tags/sec
Editing distance	Up to 1m (depending on multiple factors as set transmit power, GEN2 settings, used tags, and more)
Transmit power	Adjustable from -10 dBm to +30 dBm in 1 dBm steps
Power over Ethernet (PoE)	PoE 802.3 af
Power consumption	max. 12W

ENVIRONMENTAL

Ambient temperature	0 - 35°C (equipment for normal indoor use)
Relative humidity	0 - 90% (non-condensing)

PRODUCT ORDER CODES

UHF RFID POS solution	
EU version (ETSI)	21-310.EU
US version (FCC)	21-310.US

I.4 Callidus 8 port UHF RFID reader Gen2

PRODUCT FEATURES

- RFID tag reading, inventorying and editing
- People counter
- Additional alarm outputs, binary inputs and binary outputs
- Smart way of RFID detection inside AM TRX or RF TRX pedestal and even outside the pedestal
- Allows power over ethernet or external adaptor
- Easy installation and setup
- External and internal alarm actions
- Metal housing, Horizontal or vertical installation allowed
- Color - gray

CONNECTIVITY

- UHF RFID antenna 8x SMA female / 50 Ohms
- LAN 10/100Mbit Ethernet, IPv4 DHCP or static IP
- USB 1x USB B
- Binary input 2x opto isolated, max. 30VDC
- Binary output 2x opto isolated, max. 60V/0.5A DC

USER INTERFACE

- Reset button, optical indicators (2pcs RGB LEDs) and sound indicator (internal buzzer)

SOFTWARE INTERFACE

- RFID module API Callidus REST API with HTTP GET or POST requests
- All configuration parameters and device functionality can be controlled via webserver or with customized software that communicates with the reader via REST API

MECHANICAL

Width	8.9 cm (3.5 in)
Lenght	17.5 cm (6.89 in)
Thickness	2.6 cm (1.02 in)
Weight	0.35 kg

ELECTRICAL

Power over Ethernet (PoE)	PoE 802.3 af
External power supply (optional)	48V/0.5A, max. 12W
Operating frequency (EU)	865 - 868 MHz
Operating frequency (US)	902 - 928 MHz
RFID protocol support	Gen2

DETECTION PARAMETERS

Reading distance	Up to 500 cm (16.4 ft), depending on position, presence of metals or objects filled with liquid, used tags, antenna gain and more)
Reading speed	Up to 750 tags/sec

ENVIRONMENTAL

Ambient temperature	0 - 35°C (normal indoor use)
Relative humidity	0 - 90% (non-condensing)

PRODUCT ORDER CODE

Callidus 8 port UHF RFID reader Gen2	18-333
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RFID Dashboard page

RFID System Admin ⌵ ⏻

- Dashboard
- Tags
- Edit tags
- Graphs

System configuration

- RFID
- Autonomous mode
- People counting
- Alarms
- GPIO
- Date & time
- Networking
- Firmware update
- Factory reset

DOMŮ > Dashboard

Visitors (in / out / AVG)
0 / 0 / 0

Alarms (OUT / in / false)
64 / 0 / 0

External alarms (GPIO1 / GPIO2)
0 / 3

Tags (unique / total)
5 / 228184

Tags memory (used / total)
5 / 2000

Radio temperature
35 °C

Device status

- Currently reading ●
- RTC ●
- Communications ●
- Memory I2C ●
- Memory SPI ●
- Memory PS SPI ●
- Backup battery 3.28 V
- 5V bus 5 V
- 12V bus 12.02 V

System status

Date&Time:	úterý 1. listopadu 2022 13:38:54
Uptime:	0 day(s), 01:39:04
Serial number:	636559
MAC:	E8:EB:1B:34:07:4D
SW / Build:	v0.95.0 @ Nov 1 2022 11:57:32
Supported protocols:	GEN2

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▪ Page of RFID tags in the memory

RFID System Admin

- Dashboard
- Tags
- Edit tags
- Graphs
- System configuration
- RFID
- Autonomous mode
- People counting
- Alarms
- GPIO
- Date & time
- Networking
- Firmware update
- Factory reset

DOMÚ > Tags

Tag results

#	Action	EPC	TID	Port	First seen	Last seen	Count	Last RSSI	Max. RSSI	Direction
1		FFFF0019961400472380168F	E2003412013C02000353C339	1	1. 11. 2022 12:14:46	1. 11. 2022 13:31:54	210935	-51	-34	✘ Unknown
2		FFFF1170200002BEA4E0097A	E2801170200002BEA4E0097A	1	1. 11. 2022 12:23:06	1. 11. 2022 13:31:52	3110	-53	-51	✘ Unknown
3		1723	E2003412012EF8000BC4456F	1	1. 11. 2022 12:45:10	1. 11. 2022 13:31:54	14135	-70	-63	✘ Unknown
4		300833B2DDD9014000000000	E280113020003027185208D5	1	1. 11. 2022 13:21:52	1. 11. 2022 13:21:52	1	-53	-53	✘ Unknown
5		E28069950000500082D4D07A	E28069952000500082D4D07A	1	1. 11. 2022 13:25:10	1. 11. 2022 13:25:35	3	-74	-72	✘ Unknown

Showing to of rows

Start inventorying
Read from buffer
Clear buffer

Statistics

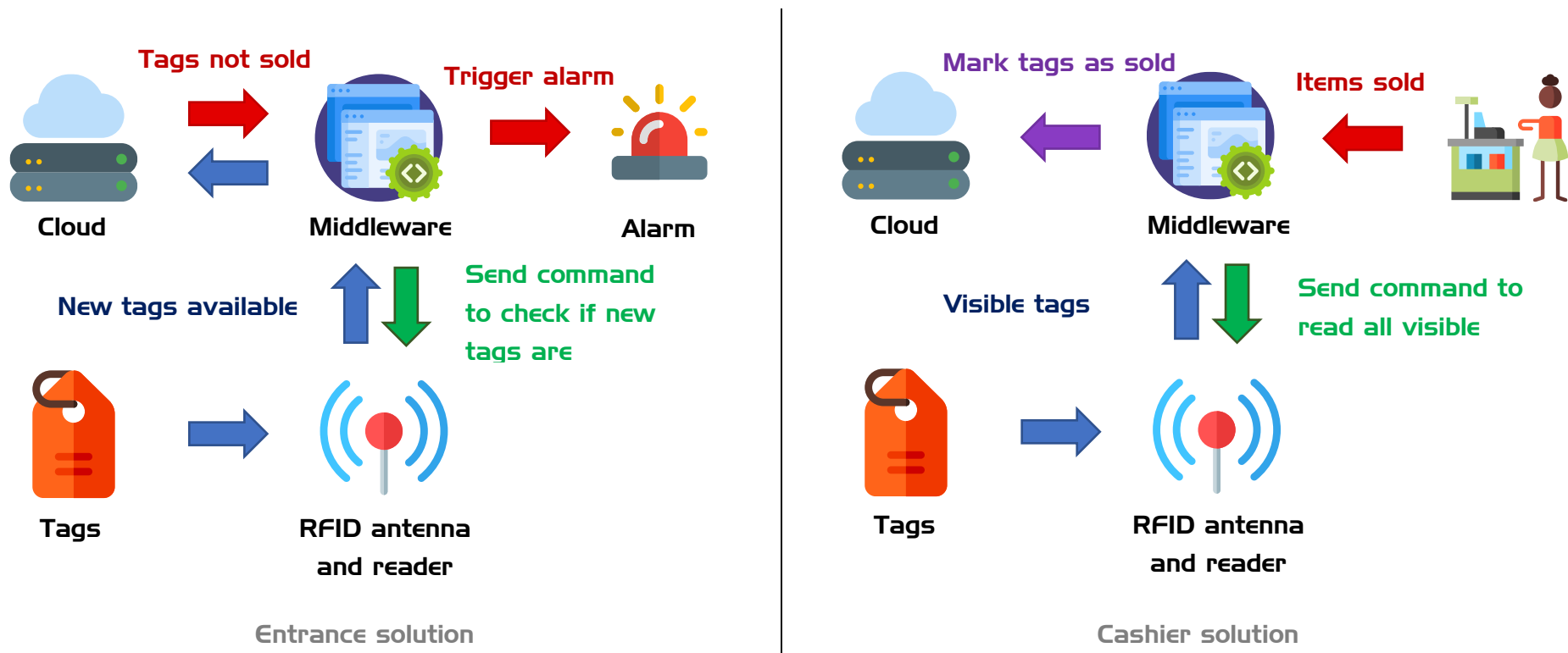
- Unique tag counter: 5
- Total tag counter: 228184
- Time: 4678.239 seconds
- Read rate: 49.7 tags/seconds
- Free memory: 1995 unique tags

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I.5 Possible RFID solutions

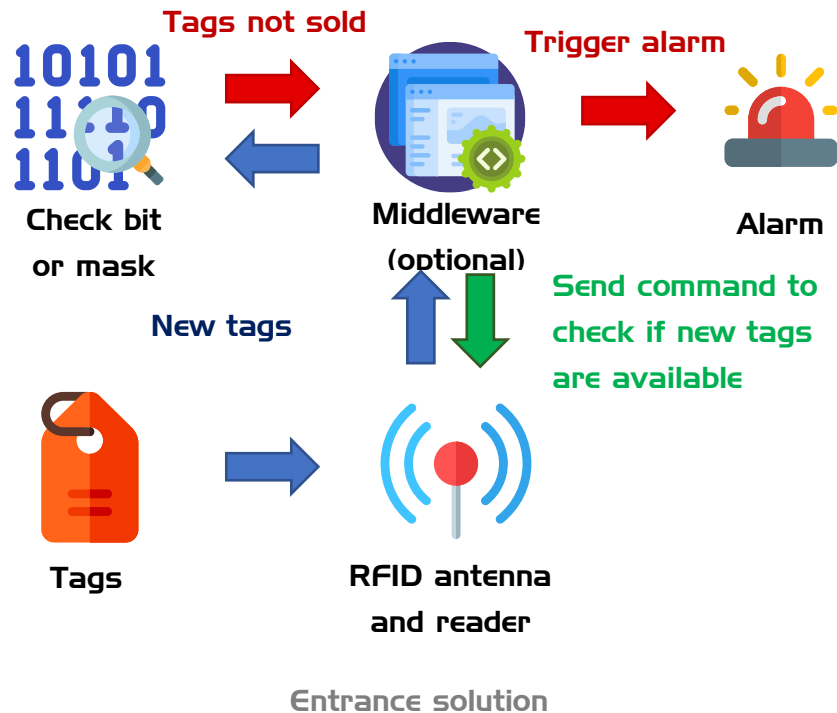
I.5.1 Cloud solution

Information about tags is stored in database. Middleware has to periodically send command to retrieve tags in field from reader and then check if product is sold or not. Tags are deactivated also with middleware, which will send command to database, marking all of the tags as sold.

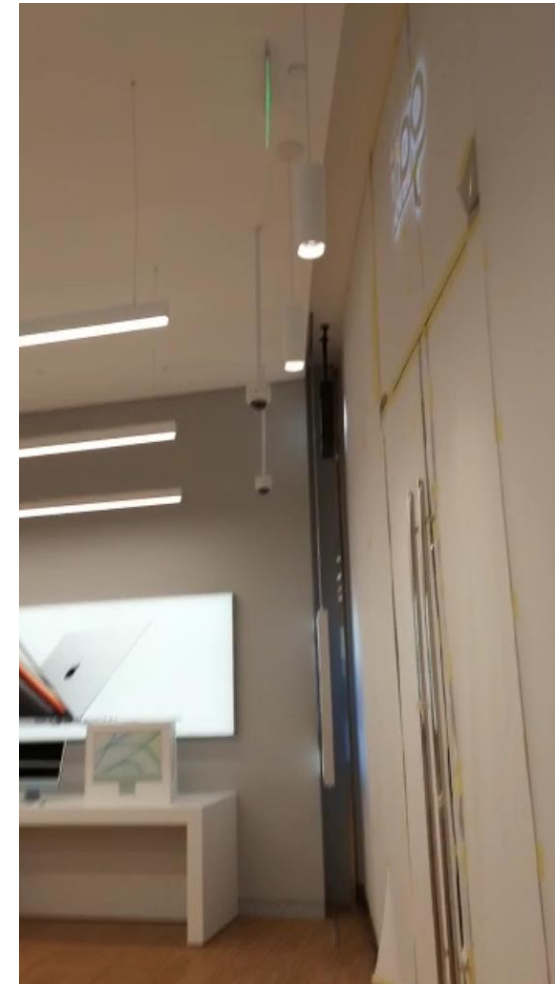
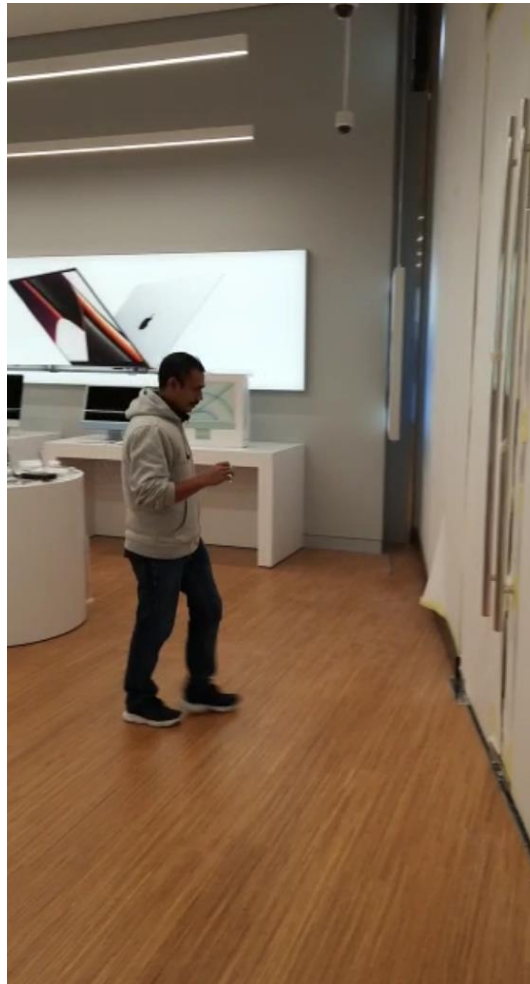


I.5.2 Bit or mask solution

Information is stored inside tag. Middleware or reader can check if tags in field have corresponding mask and then trigger alarm if needed. Deactivation is held by middleware, which will send command to reader and reader will change EPC to different mask or simply kill tag.



- RFID in the Apple store



Callidus

Callidus trading, spol. s r.o.
Pašerových 1270/1
709 00 Ostrava
Czech Republic

www.callidus.cz
info@callidus.cz

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