RACE RESULT

TRACK BOX PASSIVE

Data Sheet

Track Box Passive - Data Sheet

The **RACE RESULT Track Box Passive** combines a custom UHF reader and antenna, LTE modem, GPS module and internal battery all in to one ready-to-go unit. It is primarily designed for sports timing using **passive UHF transponders**, making it the ideal solution for setting up additional split points on a race course.

The transponder detection data, current GPS time and position of the Track Box is all uploaded to the server making it easier than ever to track participants.

Beyond sports timing, many other areas of application are conceivable where **tracking** or **monitoring** of individuals is required such as contact tracing within a facility. To find out more, visit our TAVI solution website.

With a weight of just 1.7kg/3.7lbs and thanks to it's small form-factor, the Track Box Passive is easy to carry and setup takes only a few seconds. The box can run autonomously and be managed via an online interface. The battery can last for a full race day and directly connecting a solar panel allows for permanent installations with minimal hardware. The design contains a foldable mounting arm with magnets to attach the device to metal surfaces and a stable stand to place it on the ground.

Track Box Passive Features:

- LEDs indicating GPS, network and reader status at any time
- Antennas for 4G/3G/2G, 2.4GHz, GPS and UHF RFID
- GPS location recorded for each passing (even when box is moving)
- Automatic NTP/GPS UTC time synchronization
- Automatic interference avoidance among close Track Boxes (patent pending #EP19213045)
- Automatic standby when laid flat facing upwards
- Remote control possible via RACE RESULT 12 Software:
  - Standby (reduce battery consumption)
  - Lock (button disabled, LEDs OFF)
  - Status indication (battery, noise, errors)
- Easy boot up with a single button
- Simple open protocol:
  - Optimized for low data volume and low power consumption
  - HTTP-POST interface (see documentation in our KB)
  - User-configurable server address
  - Automatic over-the-air firmware upgrade
- Auto standby option

Custom RACE RESULT RFID Reader

- Lowest power consumption in the market (4W)
- RAIN UHF Gen2 protocol parameters tailored specifically for sports timing applications
- Custom integrated antenna design

Standards & Dimensions	
Protection class (power connector plugged in or closed)	IP54
Regulatory conformity and standards	EN60950 (safety) EN50581:2012 (RoHS) EN302208 (UHF RFID) EN301489 (2.4GHz) FCC Part 15.247 (UHF RFID) FCC Part 15 (2.4GHz) ARIB-STD-T106 (UHF RFID)
Regulatory regions	ETSI_LOW, ETSI_HIGH, FCC, CANADA, JAPAN, AUSTALIA, CHINA,...
Versions	1) 866MHz/ETSI LOW 2) 915Mhz/FCC 3) 915Mhz/ETSI HIGH, CANADA, AUSTRALIA, CHINA, JAPAN,...more
Temperature range	-20°C to 50°C
Dimensions/weight	335x160x55mm/1.7kg
Compatible Transponder type	RACE RESULT Passive Transponder (manufacturing date after September 2018)

Power & Battery	
Battery	3x4000mAh 3,7V Li-Po (45Wh total capacity)
*Battery life	12-18h (UHF on – blue LED ON) (standby) 10 days
Charging time (0% to 90%)	6h (reader OFF – blue LED OFF) 10h (reader ON – blue LED ON)
Charging temperature	0°C...40°C
Power consumption 12V DC supply	4W (reader ON, battery full) 10W (battery charging)
DC power supply	12V...15V, 800mA (battery charging) 10.8V PB battery undervoltage protection
AC power supply	100...240V 50/60Hz
Solar power supply	5V...25V(4W/6W/8W/10W) 30W or 50W "12V" panel recommended DC>17V switches box into solar mode

**Depending on chips in range and temperature*

Detection & Passings	
Memory	40.000 passings (not persistent)
Timing resolution	1/10th second
Timing accuracy	Up to 200ms, depends on speed and distance between box and transponder
Detection rate** (clear line of sight to visible transponders at 5x transponders per second = 300x/min)	>99% within 4m of a single box >90% within 8m of a single box >99% between two boxes with 8m distance
Max speed	100km/h/60mph (single transponder in read zone)
Max simultaneous transponders	40x transponders in read zone
Max theoretical throughput	300x transponders per minute

***See graphic page 4*

RF Characteristics	
2.4GHz channel frequencies [MHz] (worldwide compliance)	1:2480/2410 5:2415/2445 2:2405/2470 6:2460/2430 3:2425/2465 7:2435/2455 4:2475/2440 8:2450/2420
2.4 GHz TX power	10dBm EIRP (3,5dBm + 6.5dBi Antenna Gain)
2.4Ghz Signal	O-QPSK IEEE 802.15.4 (5MHz Channels)
2.4 GHz range	50...150m
UHF bands ETSI LOW FCC/CANADA ETSI HIGH AUSTRALIA CHINA JAPAN	 865.7/866.3/866.9/867.5MHz 51x channels 902.5...927.5 MHz (500kHz spacing) 900...930MHz Bands depending on regulatory settings
UHF TX power	36dBm EIRP typical (up to 39dBm EIRP, depending on regulations)
UHF RX sensitivity	-85dBm
UHF Modulation	PR-ASK / CW
Integrated UHF antenna	6dBi gain 90° beamwidth

Connectivity & GPS	
Internal GPS	Qualcomm gpsOne Gen8c with GPS, GLONASS, BeiDou/Compass, Galileo and QZSS
29-band 4G/ LTE/3G/2G module worldwide coverage	**FDD:** B1/B2/B3/B4/ B5/B7/B8/B12/B13/ B18/B19/B20/B26/B28 **TDD:**B38/B39/B40/ B41 **WCDMA:** B1/B2/B4/ B5/B8/B6/B19 **GSM:** B2/B3/B5/B8
SIM-Card	Standard/mini-size
Antennas	Internal (3.5dBi peak gain)

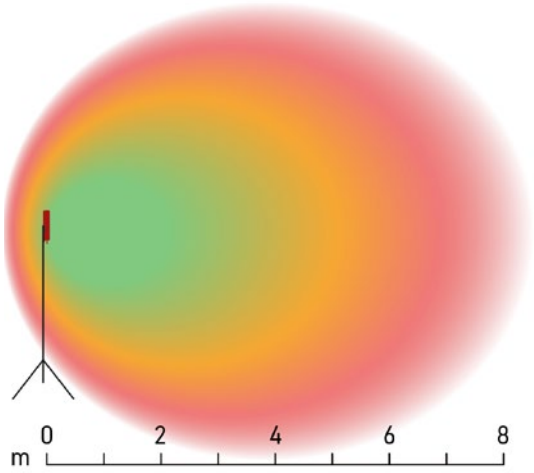
Sold as Pack with 2 Track Boxes	
Content	Foam-padded case with shoulder strap 2x Track Boxes 2x tripod mounts 2x stakes 2x adapter for tripods with standard thread (1/4" UNC) 1x double charge adapter 1x 12V AC adapter 1x mains power lead
Dimensions/weight	390x300x135mm/5kg

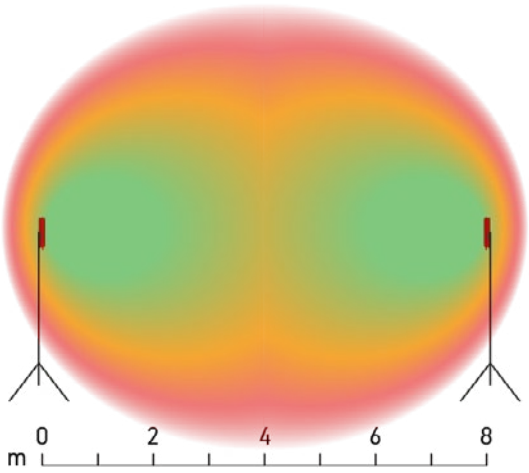
Detection Rates

Graphic refers to RACE RESULT Bib Transponder with single chip at running event. Bib worn visible on front of torso for direct line of sight.

Expect higher reads in free air (MTB Plate, Seat Post). Other transponders (HuTag, Disposable Triathlon Transponder) are not recommended due to their design and positioning, especially in ranges > 2m.

Two opposing boxes automatically communicate and automatically sync to each other so they do not interfere.

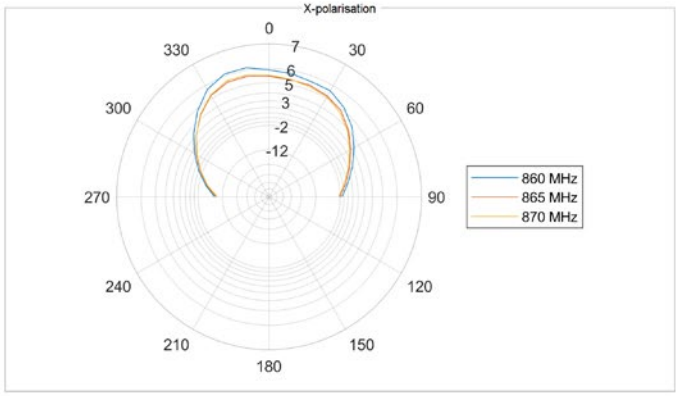


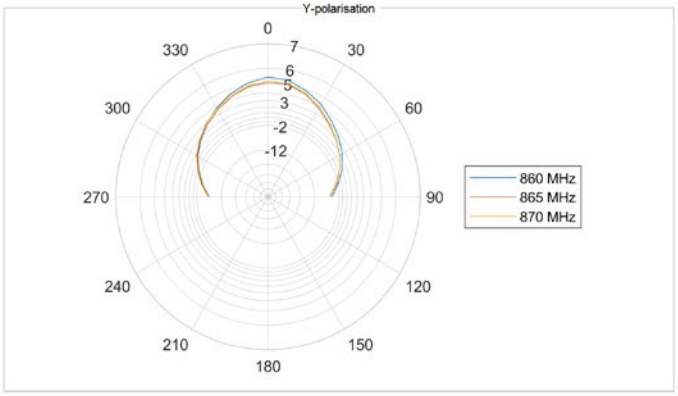


Detection Rates

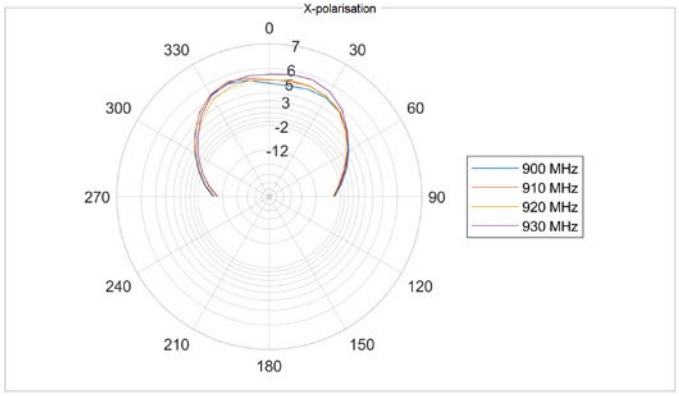
GOOD BAD

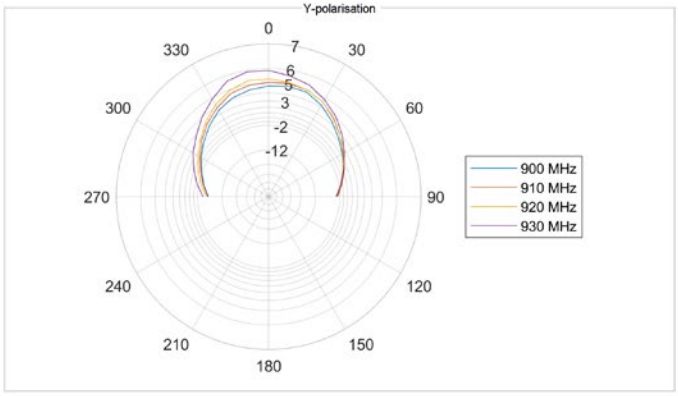
ETSI/EU Antenna Diagram





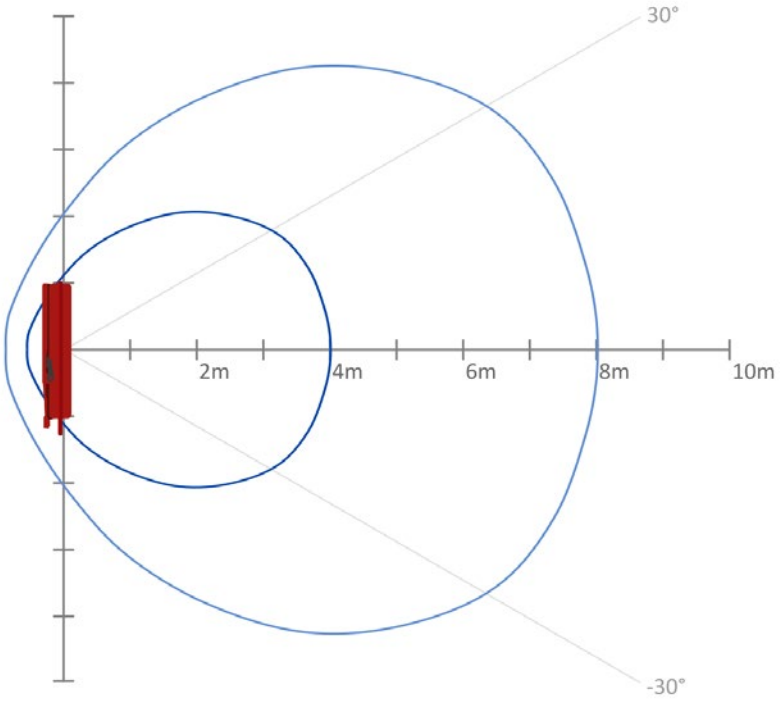
FCC and 915MHz Antenna Diagram



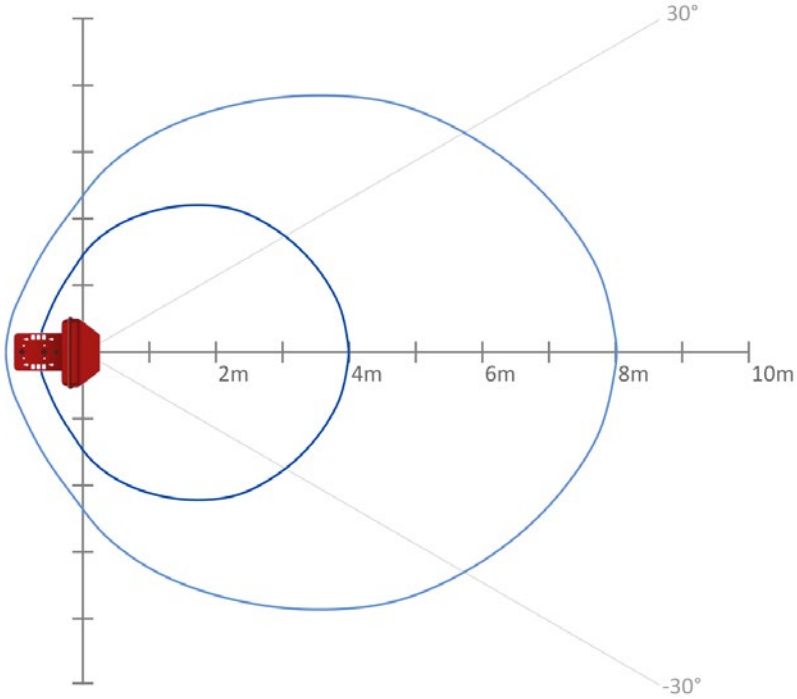


Detection Field Strength Pattern

Sideview

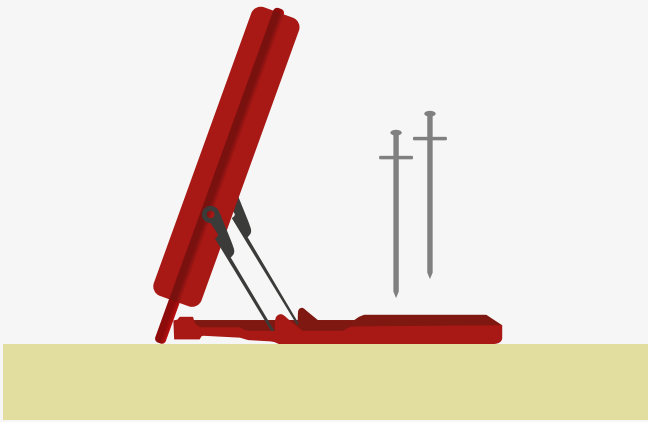


Topview

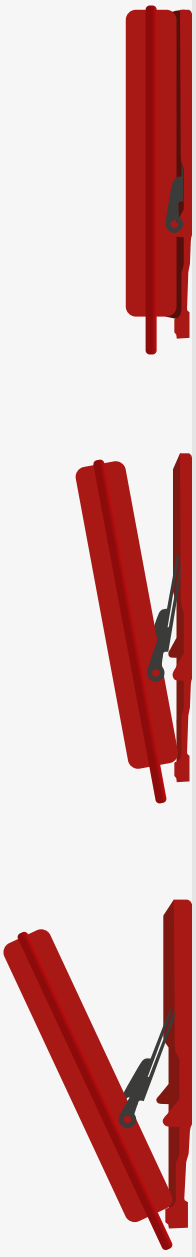


Mounting Options

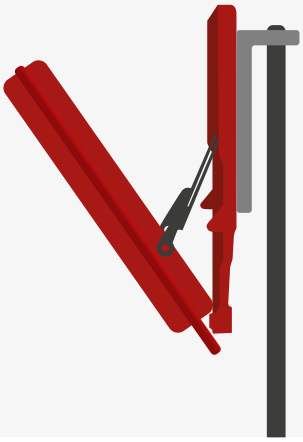
Standing on the floor (with stakes)



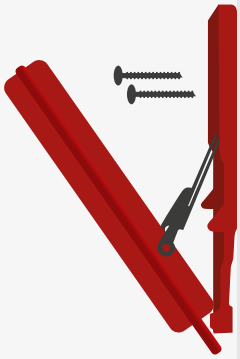
Hanging on magnets



Mounted on tripod



Mounted on wall with screws



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