SPEC SHEET · NOVEMBER 2026

Chillomètre

BY **CONCEPTIONJFG**
DESIGNED IN QUEBEC

A 24 GHz FMCW radar that measures the vehicles on your street, in both directions, day and night. Set up with a QR code, no app, no cloud.

24 GHz	100 m	±20 °	1 km/h	2 directions	0 apps
FMCW radar	max. sensor range	field of view	resolution	separated automatically	everything runs in the browser

01 Specifications

What the radar measures, how it connects and what it keeps.

MEASUREMENT	
Technology	24 GHz FMCW radar
Measures	Speed, distance, angle and direction
Range	Up to 100 m (sensor); on a street, mostly between 10 and 60 m
Field of view	±20° horizontal
Resolution	1 km/h · 1 m
Readings	Several per second, combined into one speed (the median)
Angle correction	Automatic, learns the line of the street
Calibration	Step-by-step, with your own vehicle on cruise control

ENCLOSURE	
Form factor	For outdoor use · 100 × 68 × 50 mm
Sensor temperature	-40 to 85 °C
Power	USB 5 V, phone charger (1 A)
Mounting	1.8 to 2.5 m high · 2 to 3 m from the edge of the street · aimed at ~15°
Conditions	Day and night, rain, snow

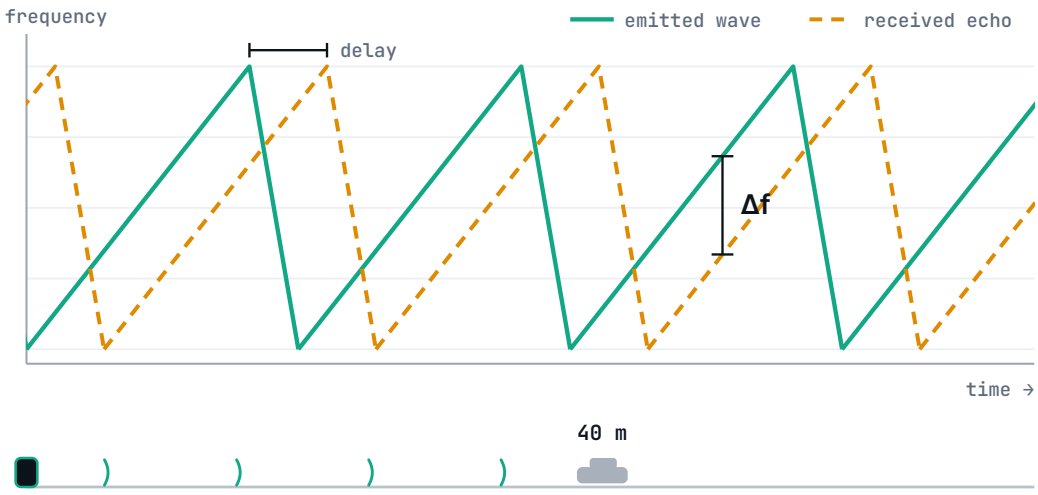
CONNECTION AND DATA	
Network	2.4 GHz Wi-Fi, or the box's own standalone network (WPA2)
Setup	QR code · iPhone and Android · no app
History	~65,000 vehicles in detail + ~1,000 days of summaries
Export	CSV
Updates	Through the page, with automatic rollback to the previous version if something goes wrong
Security	Unique password per device · protected settings · lockout after 5 attempts
Privacy	No images, no licence plates, no cloud

- Indicative measurements: the radar is not certified for issuing tickets.

02 How it measures

It’s an FMCW radar: it sends out a 24 GHz radio wave whose frequency climbs in a ramp, again and again. Each vehicle’s echo comes back with its distance, its angle and its speed: three measurements at once. Nothing to guess from a picture: the speed is measured directly.

FIGURE 1 · THE EMITTED WAVE AND ITS ECHO



The farther away the car, the later the echo arrives, and the bigger the frequency gap **Δf**.

DISTANCE

The frequency gap

The echo comes back with a delay. Since the frequency has climbed in the meantime, the gap Δf between the emitted wave and the echo gives the distance.

$$d = \frac{c \cdot \Delta f}{2S}$$

SPEED

The phase shift

From one ramp to the next, a moving car shifts the phase of its echo: that’s the Doppler effect. That shift gives its speed, directly.

$$v = \frac{\lambda \cdot \Delta\varphi}{4\pi T}$$

ANGLE

Several antennas

The same echo reaches each receiving antenna with a tiny offset. That offset gives the car’s angle.

$$\theta = \arcsin\left(\frac{\lambda \cdot \Delta\varphi}{2\pi \ell}\right)$$

At 24 GHz, the wavelength **λ** is 12.5 mm. **S**: ramp slope · **T**: ramp duration · **ℓ**: spacing between two antennas · **c**: speed of light.

Then the software does the rest

01 **Readings** — several per second, as the car goes by →
02 **Track** — one car’s readings, grouped together →
03 **Direction** — the distance going down or up →
04 **Angle** — the line of your street, learned on its own →
05 **Speed** — the median, adjusted by your calibration

Tracking: one speed per car

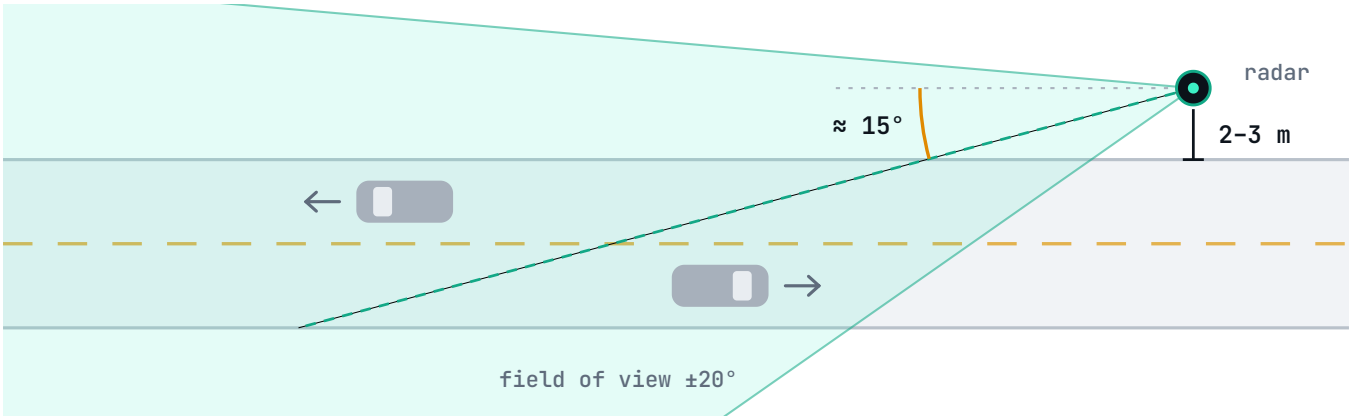
Each vehicle becomes a track: its readings are grouped together, its direction comes from its distance going down or up, then the viewing angle is corrected. The radar learns the line of your street on its own.

- ☑ Both directions, separated automatically
- ☑ Angle correction it learns by itself
- ☑ Calibrated with your own car, on cruise control

03 Mounting

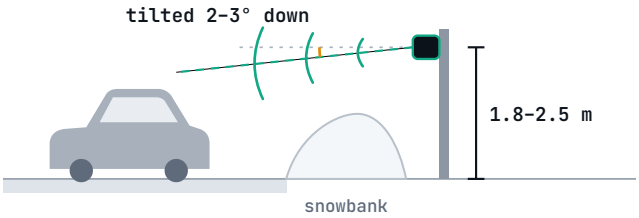
On a post, a fence or a wall, almost in line with the street. Never facing the street: a car passing side-on barely gets any closer to the radar.

FIGURE 2 · TOP VIEW



The radar 2 to 3 m from the edge of the street, aimed about 15° off the street, almost in line with it. It sees cars in both directions.

FIGURE 3 · SIDE VIEW



High enough to see over the snowbanks. Angles exaggerated: not to scale.

Mounting guide

Mount	A post, a fence or a wall on your property
Height	1.8 to 2.5 m, to see over the snowbanks
Distance	2 to 3 m from the edge of the street
Aim	About 15° off the street, almost in line with it. Never facing the street.
Tilt	Level or tilted 2 to 3° down
Power	USB phone charger (5 V, 1 A)
Aiming	The Aiming page shows the distance and angle of what it sees, live, so you can point it just right.

04 Setup

Connected in two minutes, no app. It all happens with your phone's camera, iPhone or Android.

1 Plug it in
A USB phone charger is all it needs. When its light blinks twice, it's ready.

2 Scan the label
It has two QR codes and the radar's password, unique to each device (••••-••••-••••). The first code connects you to the radar's network, and its page opens on its own. If it doesn't, the second one opens it.

3 Pick your Wi-Fi… or don't
Put it on your home Wi-Fi, or keep it standalone: it creates its own network, perfect at the far end of the yard.

4 Aim, then watch
The Aiming page shows the distance and angle of what it sees, live, so you can point it just right. Then the speeds come in on their own.

Two ways to connect it

Home Wi-Fi `2.4 GHz`
The radar joins your Wi-Fi. You open its page from any device on that same Wi-Fi. Its own network stays closed, and reopens if your Wi-Fi is gone for more than 4 minutes.

Standalone `“Use without Wi-Fi”`
The radar creates its own network (WPA2), protected by the password on its label. You connect to it when you’re nearby to see your speeds. Perfect at the far end of the yard.

Good to know

While it connects	Your phone drops off the radar’s network for a few seconds; the page warns you ahead of time. It then shows the radar’s address on your Wi-Fi, or why it didn’t work (wrong password, network not found…). Reserve that address in your router so it doesn’t change.
Power outage or router reboot	It reconnects on its own. If your Wi-Fi stays down for more than 4 minutes, the radar’s own network reopens as a fallback. It tries your Wi-Fi again every 5 minutes, whenever nobody is connected to its network.
Updates	Through the radar’s page. It refuses any file that isn’t one of its own programs, and only keeps the new version after one minute of running with the network up. If it crashes before that, it rolls back to the previous version on its own.
Factory reset	With a button on the page, or by holding the button inside the box for 15 seconds (5 seconds only reopens its network). It erases the Wi-Fi and the settings, never the password on the label.

05 Data and indicators

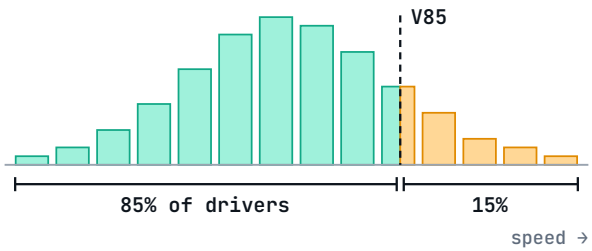
Your street, live, from home: add the radar’s page to your home screen. The last car in big digits, today’s numbers for each direction, traffic hour by hour and the speed distribution.

Average
The average speed in each direction, by hour and by day.

V85
The speed that 85% of drivers don’t exceed: the number traffic engineers go by.

% over
Every vehicle is checked against your street’s speed limit: you see how many go over, at what time and in which direction.

FIGURE 4 · V85



Concept diagram: a street’s speed distribution, and V85.

What it keeps

Individual vehicles	About 65,000, roughly two months at 1,000 cars a day
Daily summaries	About 1,000 days, nearly three years
Where	In the box, with no account and no cloud
Export	Everything exports to CSV, anytime

On your phone

- ✅ Average, V85 and % over the limit, for each direction
- ✅ Name the directions your way: “toward the school”, “toward downtown”
- ✅ Hourly chart and speed histogram
- ✅ CSV export for Excel or Google Sheets

06 Privacy and security

No camera, no cloud

- The radar measures the echo of a radio wave: it sees no images, no plates, no faces.
- Your data stays in the box and goes nowhere. No account, no cloud.
- No app: its page opens in your phone's browser.

Protected settings

- Unique password per device, on the label. It protects the radar's standalone network (WPA2).
- From your home Wi-Fi, anyone can view the page; changing a setting takes the password on the label.
- After 5 wrong attempts, the page locks for one minute.
- Verified updates, with automatic rollback to the previous version if something goes wrong.

07 Technical questions

Can it be used to give out speeding tickets?

No. The radar gives indicative measurements, to see what's really happening on your street and back up a request to your municipality. It is not certified for issuing tickets.

I don't have Wi-Fi out by the street. Will it still work?

Yes. In standalone mode, the radar creates its own network, protected by the password on its label. You connect to it when you're nearby to see your speeds.

I'm changing my Wi-Fi or router. What do I do?

Unplug and plug the radar back in three times in a row, less than 10 seconds each time: its network reopens for 15 minutes. Nothing is erased, neither your settings nor your history.

What about night, rain and winter?

The radar measures just as well at night as by day: its waves pass through falling rain and snow. Mount it 1.8 to 2.5 m high to see over the snowbanks, and keep the cover clear.

Where should I install it?

On a post, a fence or a wall on your property, 2 to 3 m from the edge of the street, aimed about 15° off the street. Check where your lot ends: the first few metres past the pavement often belong to the city, and the plow goes through there. The Aiming page shows the distance and angle of what it sees, live, to help you point it just right.

How long does it keep the data?

About 65,000 vehicles in full detail, roughly two months at 1,000 cars a day, plus a daily summary for nearly three years. You can export it all to CSV anytime.

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