



## LOCATING JAMMERS FROM A TO Z

**narda**   
Safety Test Solutions

# What is a jammer?



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## Radio jamming

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From Wikipedia, the free encyclopedia

**Radio jamming** is the deliberate jamming, blocking or interference with [wireless communications](#).<sup>[1]</sup> In some cases, jammers work by the transmission of [radio signals](#) that disrupt [communications](#) by decreasing the [signal-to-noise ratio](#).<sup>[2]</sup>

The concept can be used in [wireless data networks](#) to disrupt information flow.<sup>[3]</sup> It is a common form of censorship in totalitarian countries, in order to prevent foreign radio stations in border areas from reaching the country.<sup>[2]</sup>

Jamming is usually distinguished from interference that can occur due to device malfunctions or other accidental circumstances. Devices that simply cause interference are regulated differently. Unintentional "jamming" occurs when an operator transmits on a busy [frequency](#) without first checking whether it is in use, or without being able to hear stations using the frequency. Another form of unintentional jamming occurs when equipment accidentally [radiates](#) a signal, such as a [cable television](#) plant that accidentally emits on an aircraft emergency frequency.



### Distinction between "jamming" and "interference" [\[ edit \]](#)

Originally the terms were used interchangeably but nowadays most radio users use the term "jamming" to describe the *deliberate* use of radio noise or signals in an attempt to disrupt communications (or prevent listening to broadcasts) whereas the term "interference" is used to describe *unintentional* forms of disruption (which are far more common). However, the distinction is still not universally applied. For inadvertent disruptions, see [electromagnetic compatibility](#).



# What does the FCC say about jammer?



The use of a phone jammer, GPS blocker, or other signal jamming device designed to intentionally block, jam, or interfere with authorized radio communications is a violation of federal law. There are no exemptions for use within a business, classroom, residence, or vehicle. Local law enforcement agencies do not have independent authority to use jamming equipment; in certain limited exceptions use by Federal law enforcement agencies is authorized in accordance with applicable statutes.

It is also unlawful to advertise, sell, distribute, import, or otherwise market jamming devices to consumers in the United States.

***The use or marketing of a jammer in the United States may subject you to substantial monetary penalties, seizure of the unlawful equipment, and criminal sanctions including imprisonment.***

## Jamming Prohibited

Signal jamming devices can prevent you and others from making 9-1-1 and other emergency calls and pose serious risks to public safety communications, as well as interfere with other forms of day-to-day communications.

The use of a phone jammer, GPS blocker, or other signal jamming device designed to intentionally block, jam, or interfere with authorized radio communications is a violation of federal law. There are no exemptions for use within a business, classroom, residence, or vehicle. Local law enforcement agencies do not have independent authority to use jamming equipment; in certain limited exceptions use by Federal law enforcement agencies is authorized in accordance with applicable statutes.

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- 20 Years ago, jamming was only known to military and government
- Today, you can buy jamming equipment via the internet from 7 US\$/€
- E.g., protection of military or presidential vehicles against IED (Improvised explosive device).



**1x GPS Signal Interference Blocker Anti Tr...**  
**Case Car Power Supply Auto**  
**Gesamt: EUR 6,99**

**Jammers are still illegal!**

**Easy to install**  
Insert the appropriate cigarette lighter port

**THANKSBUYER**

**2G 3G 4G 5G Wi...**

**Application:**

1. Prevent illegal and criminal activities through mobile phones, such as prisons, detention centers, and other judicial places.
2. Prevent the leakage of important information or business secrets, such as real estate transaction sites, commercial conference rooms, troops and important confidential places,

# Why do people use GPS jammers:

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To intentionally block or interfere with GPS signals to conceal one's location/activity.

- Stealing of luxury car (no alarm possible)
- Prevent employees from accurately tracking vehicles, time on the road, unauthorized use of vehicle
- Car-Insurance fraud (No assessment of driving habits or distance traveled)
- Blocking alarms during bank-robbery
- Preventing communication of security forces during a protest
- Concealing the location of a device

# Spoofing of GPS Signals, Jammers evil Twin

## GPS Spoofing:

- Deliberately transmit GPS like signals which tricks GPS receivers into believing the signal is from a different location than they actually are.
- Capture signals from a different position and re-broadcast them.

## Why

- Cause vessels off course into hostile waters
- Disable a vessel in low waters or sand bank.
- Hide activity illegal activity
- Hide military operations, stealth.

The New York Times

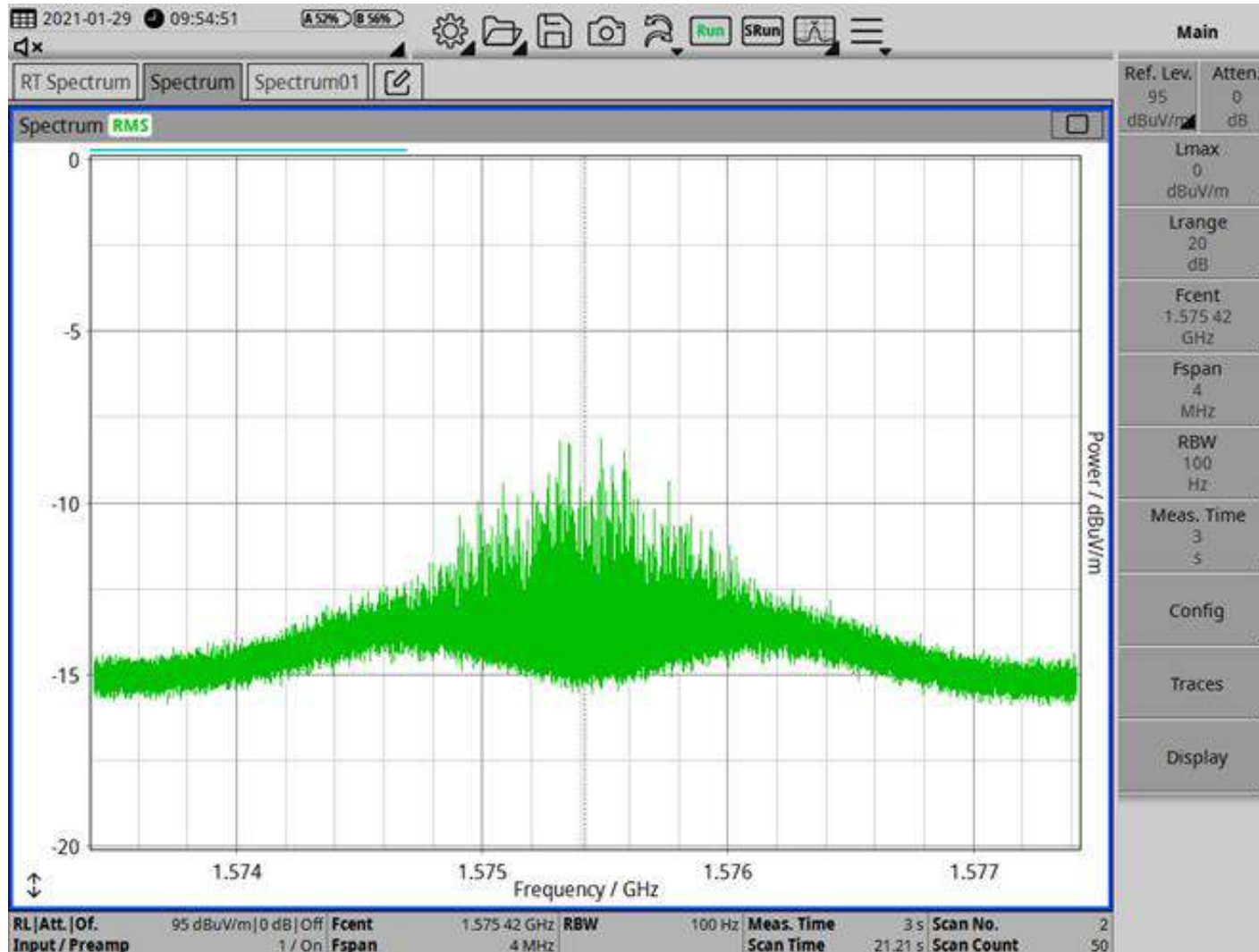
## *How Fake GPS Coordinates Are Leading to Lawlessness on the High Seas*



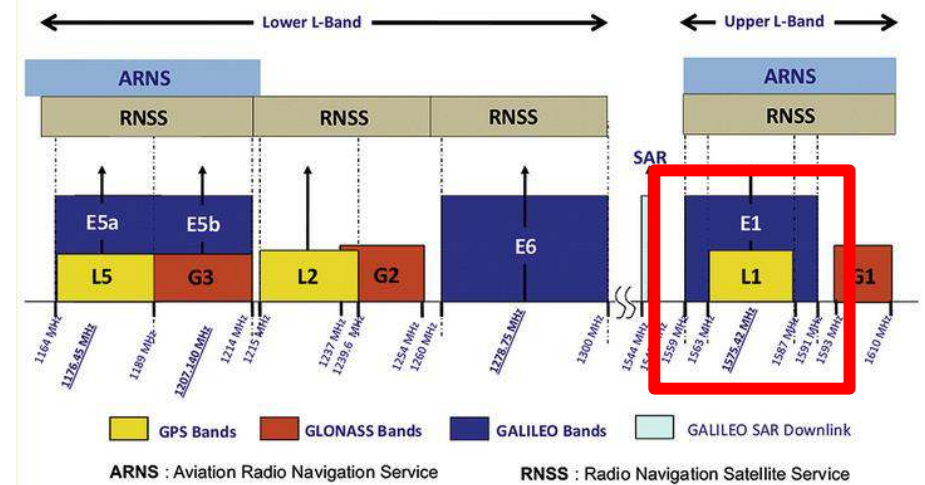
## Detection of a GPS Jammer



# How does a GPS Signal look like?



- GPS-satellites are in an altitude of 20,000 km / 12,600 miles
- Their signal on earth is very small, which means they are easily disturbed
- The most popular GPS-Band is in the upper L-Band @ 1575.42 MHz



GRAFIK: GSSC.ESA.INT/

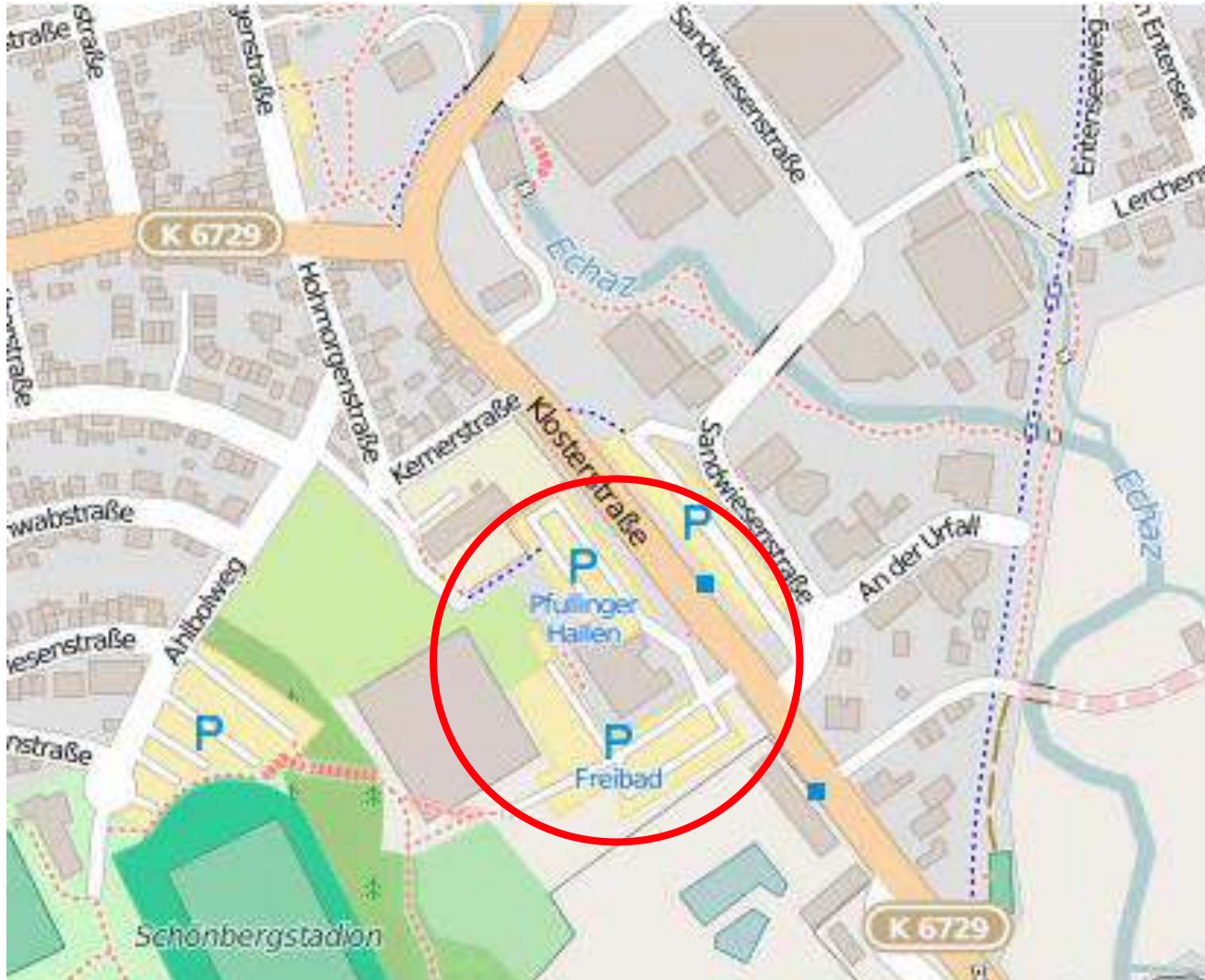


# Major questions:

- Is an automatic antenna as Narda ADFA/SignalShark sensitive enough to detect a small GPS-jammer?
- Which is the minimum distance?
- If a jammer is active, is ADFA/SignalShark still able to operate?  
Remember, automatic localization process is based on GPS-information



# Lucky coincidence: GPS problems reported from a parking lot close to Narda factory

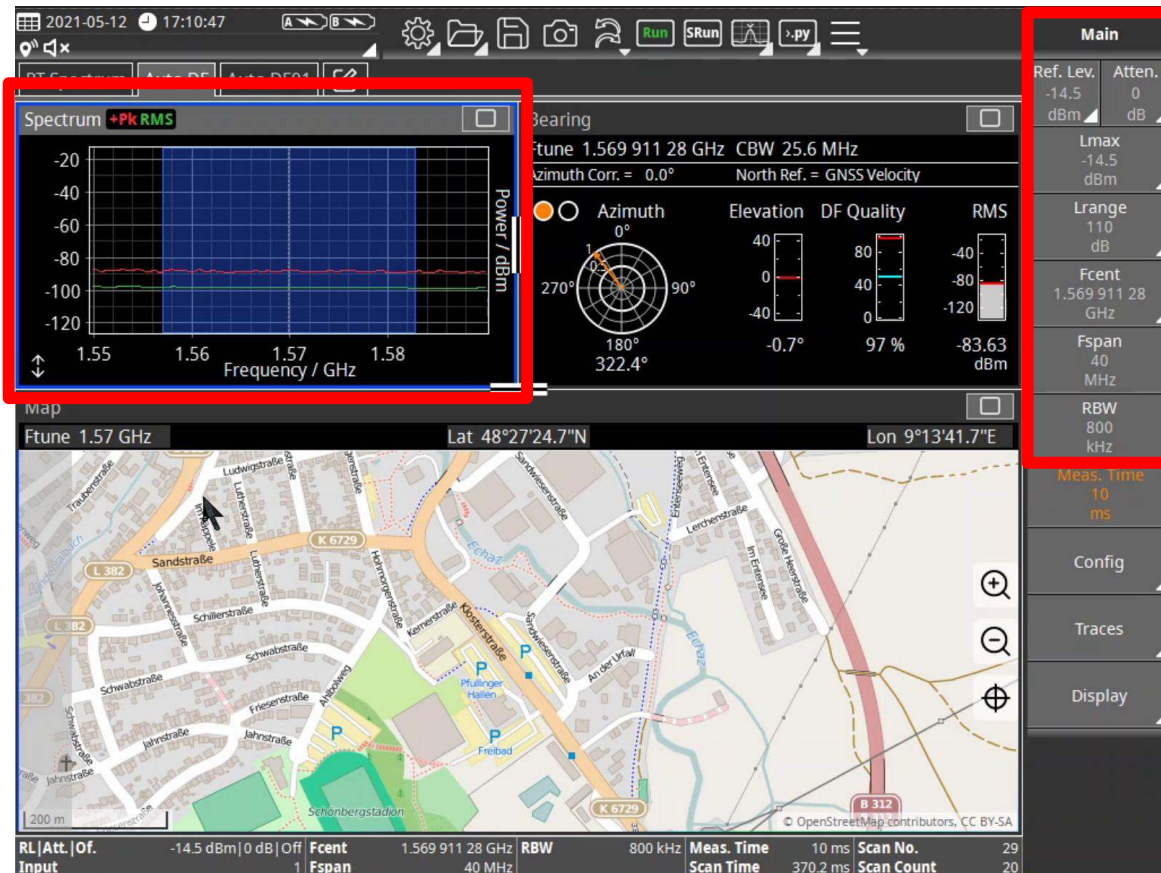


- A colleague reported that she repeatedly had problems with her car's navigation system in a parking lot.
- The suspicion: another car with a GPS jammer.

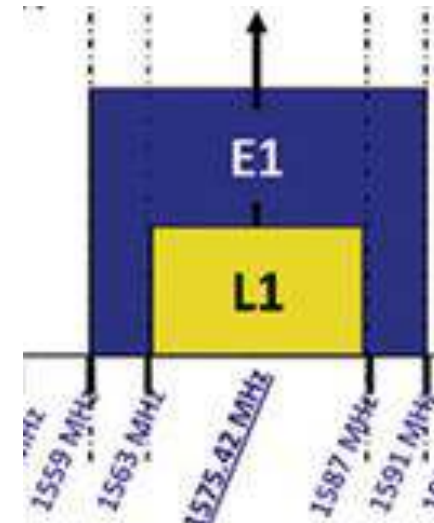




# Setting of SignalShark Spectrum-view

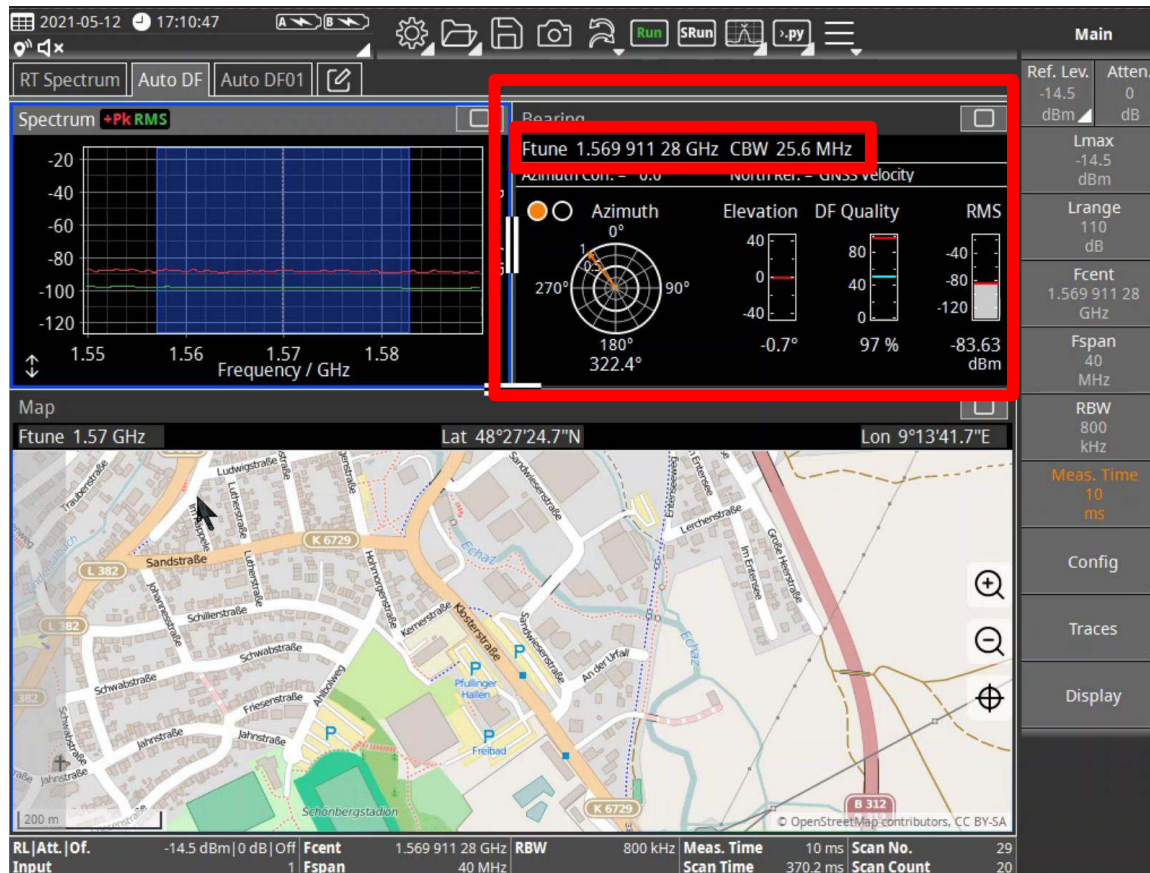


- GPS Spectrum allocation (L1):
  - Fcent 1.57 GHz
  - Bandwidth 24 MHz
- Setting SignalShark Spectrum into the same range
  - Fcent 1.57 GHz
  - Bandwidth 40 MHz to “see” also the surrounding
  - Full sensitivity, Attenuator 0 dB
- Now, spectrum is showing “silence”





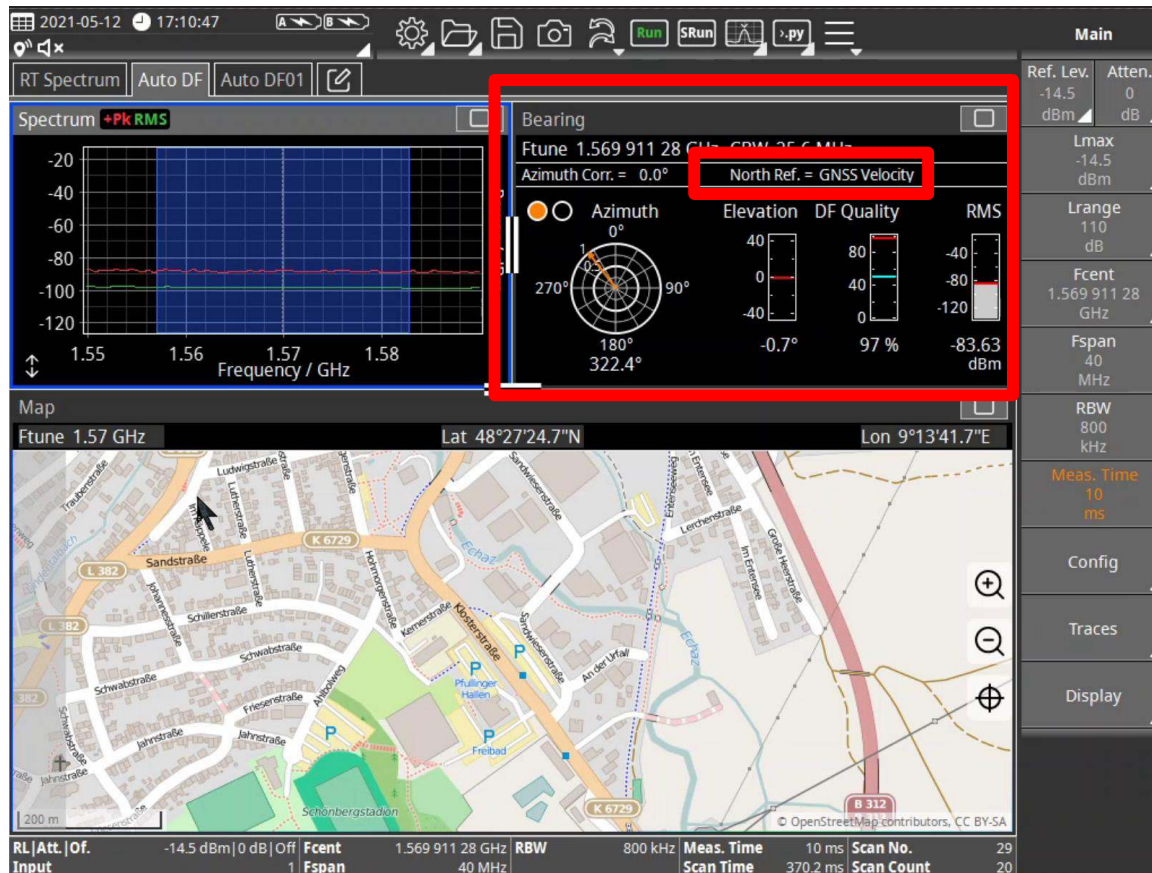
# Setting of SignalShark **Bearing**-view



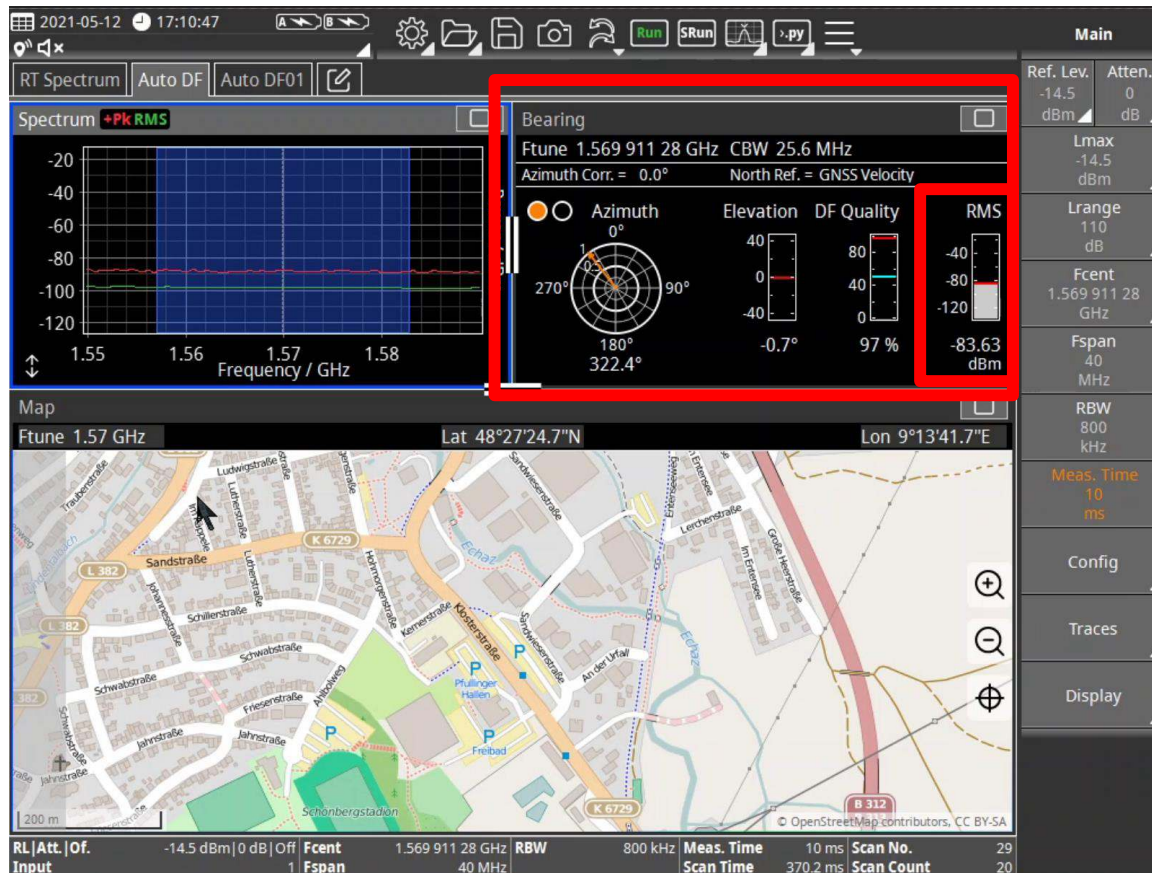
- GPS Spectrum allocation:
  - Fcent 1.57 GHz
  - Bandwidth 24 MHz
- Setting SignalShark Bearing into the same range
  - Fcent 1.57 GHz
  - Channel Bandwidth 25 MHz, marked as a blue window inside Spectrum-view

# Setting of SignalShark **Bearing**-view

- North reference is the GNSS velocity



# Setting of SignalShark **Bearing**-view

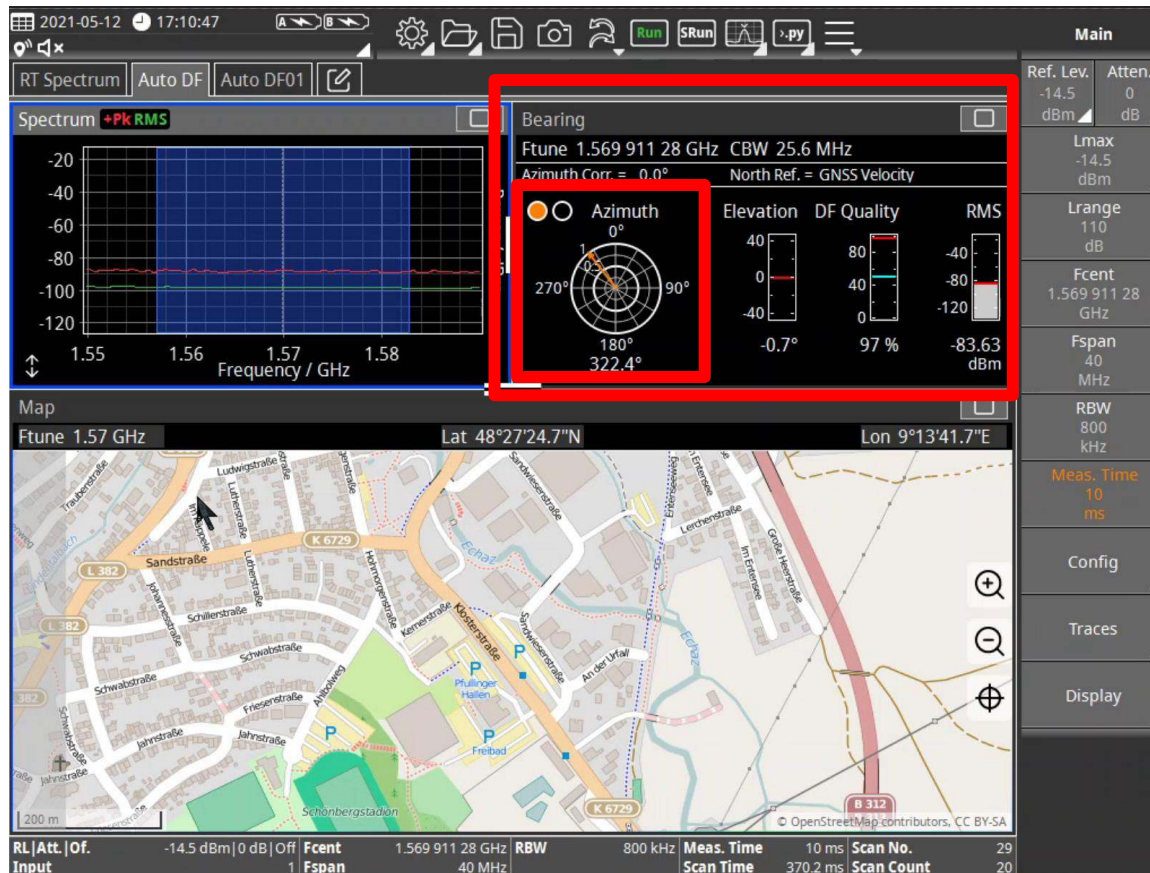


- RMS level inside the blue window is displayed by the bar-graph
- Threshold (red bar) for RMS level is set above the RMS-level, so only bearing results with a level just above noise will be accepted



# Setting of SignalShark **Bearing**-view

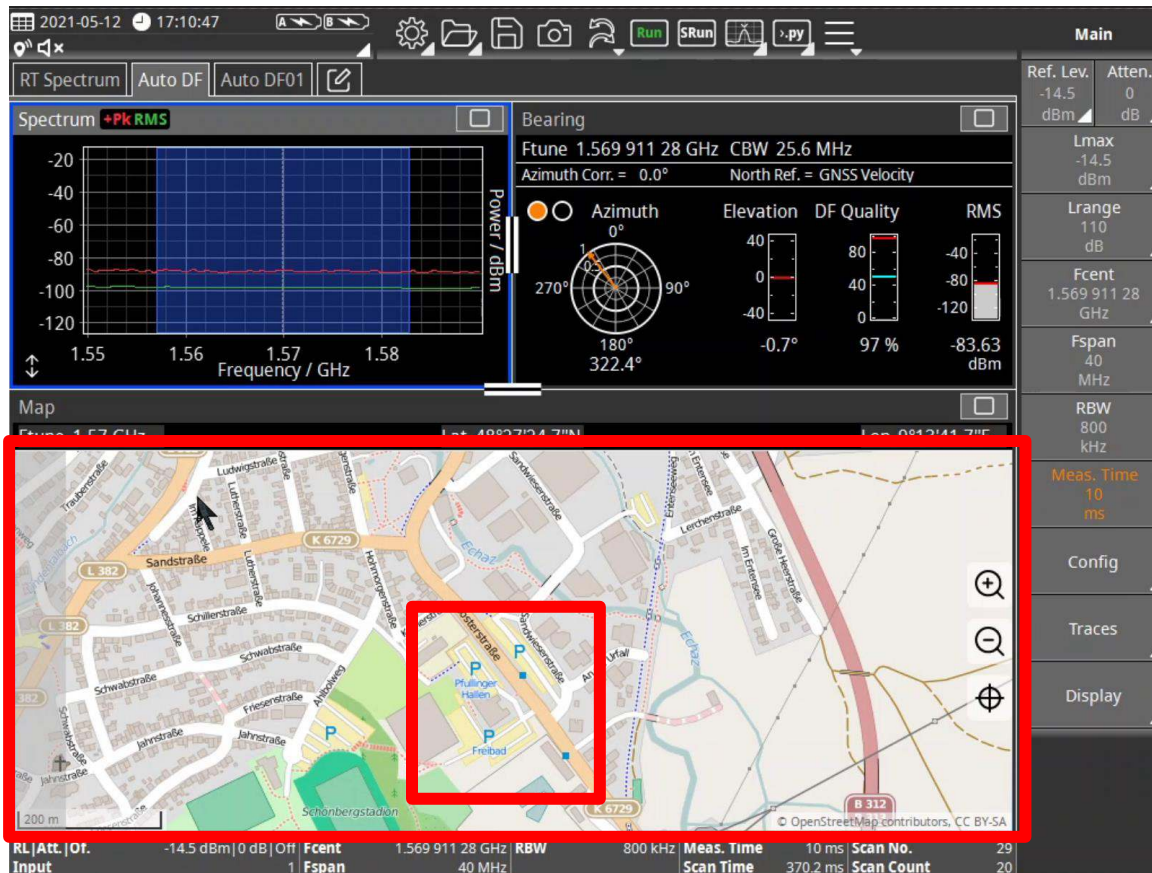
- Bearing direction will be indicated inside the polar diagram and as a red line inside the map



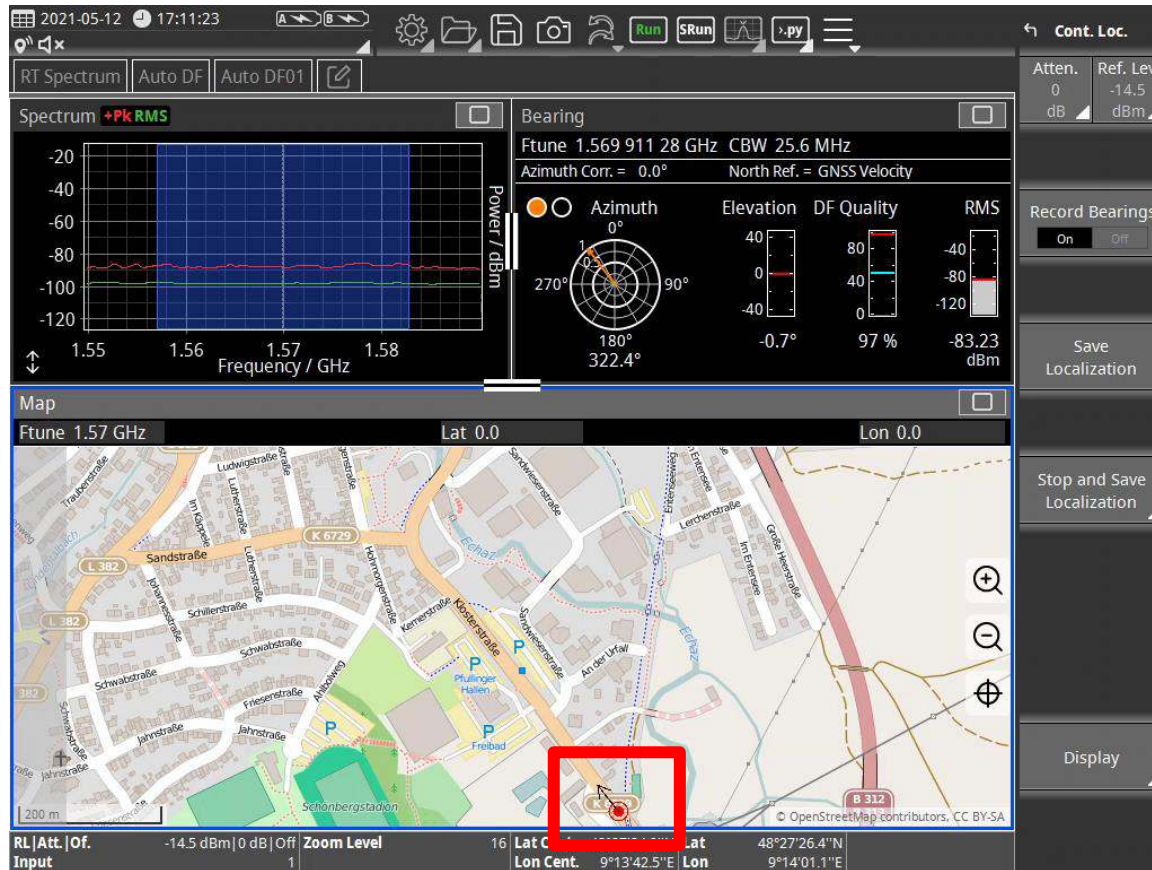


# Setting of SignalShark Map-view

- The map section has been chosen so that the parking lot is in the center

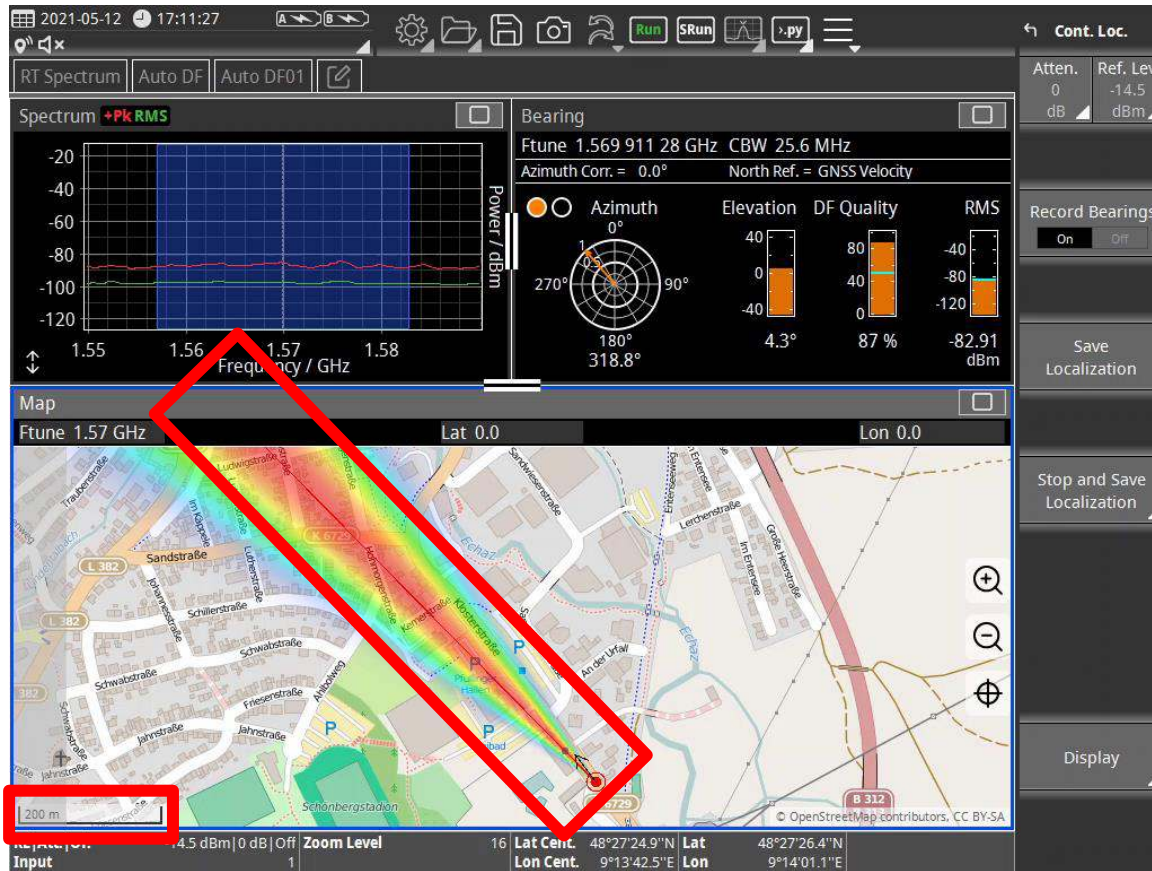


# The Hunt



- Red point is indicating the current position of the car,
- Attached black pointer the direction of measurement antenna ADFA

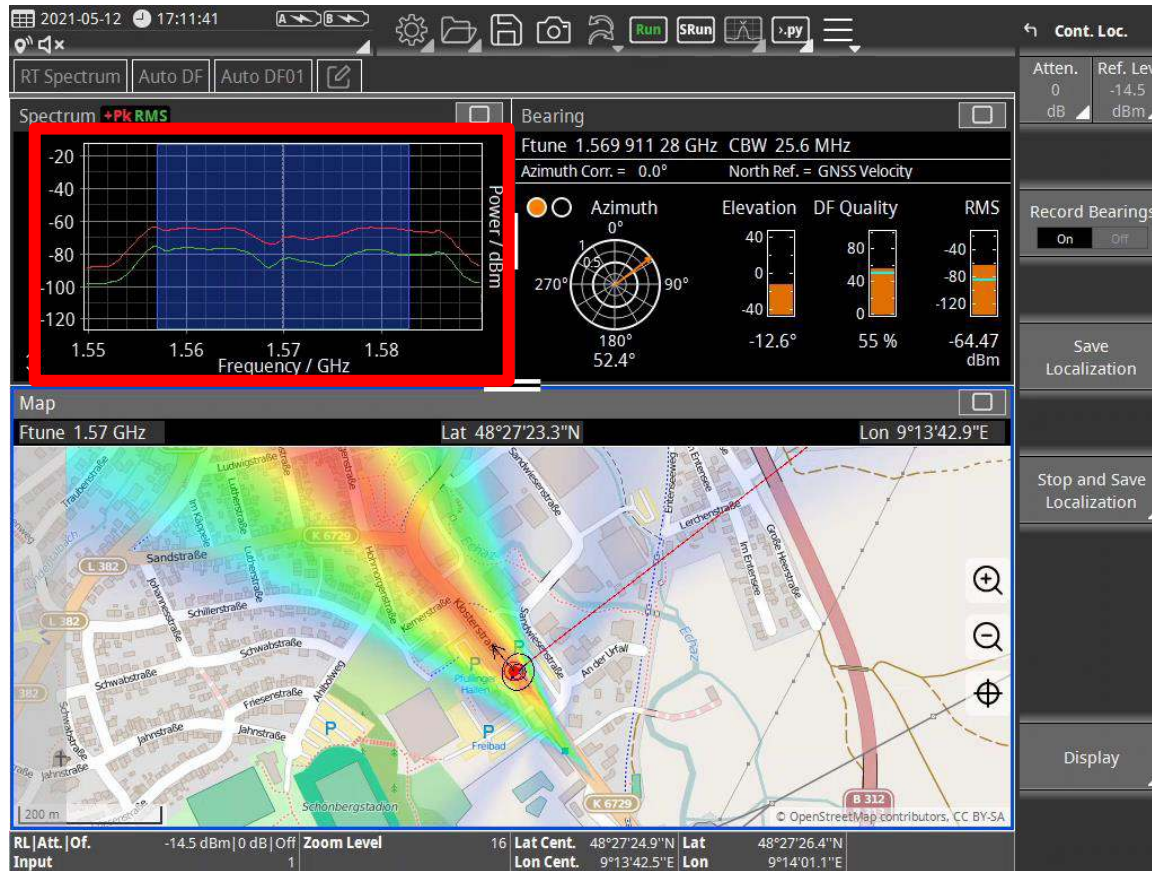
# The Hunt



- First valid bearing result from a distance of approx. 200 meters
- Open red triangle is telling continue driving north-west

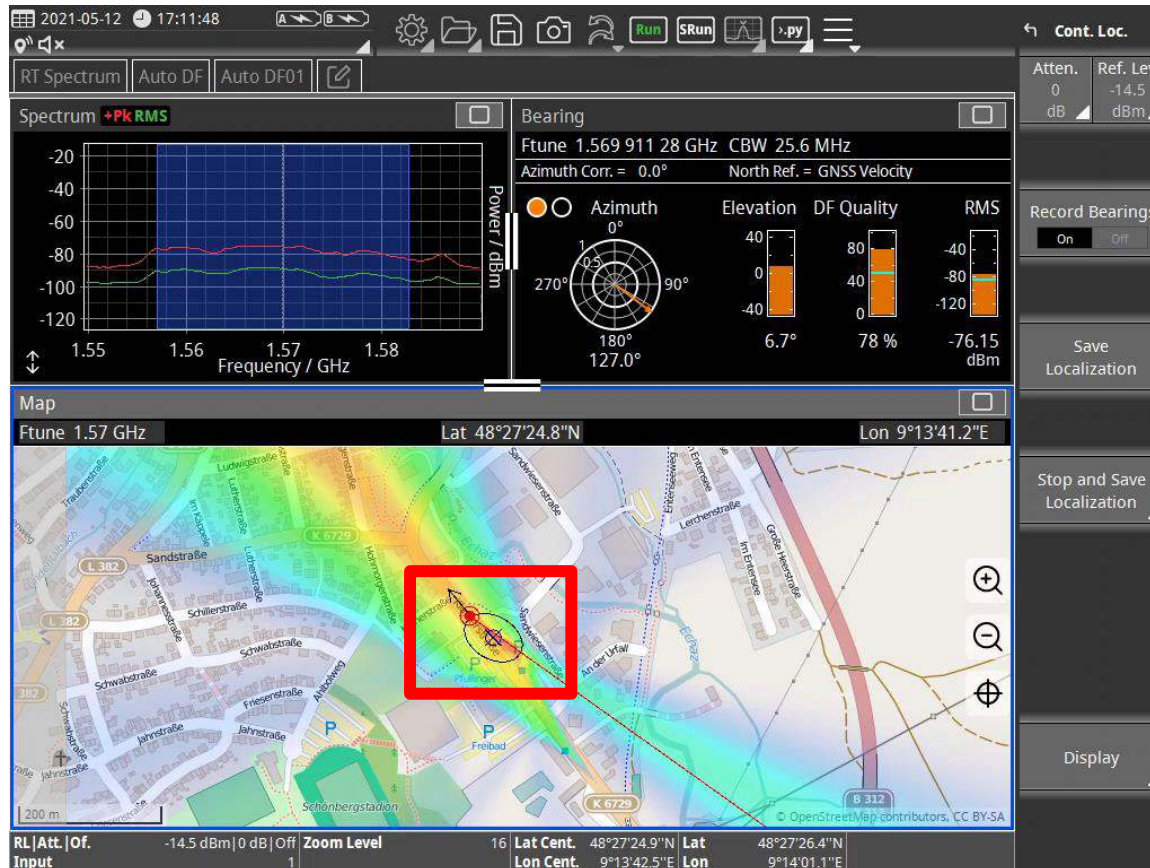


- At the height of the parking lot, you can see a large, broadband signal in spectrum-view



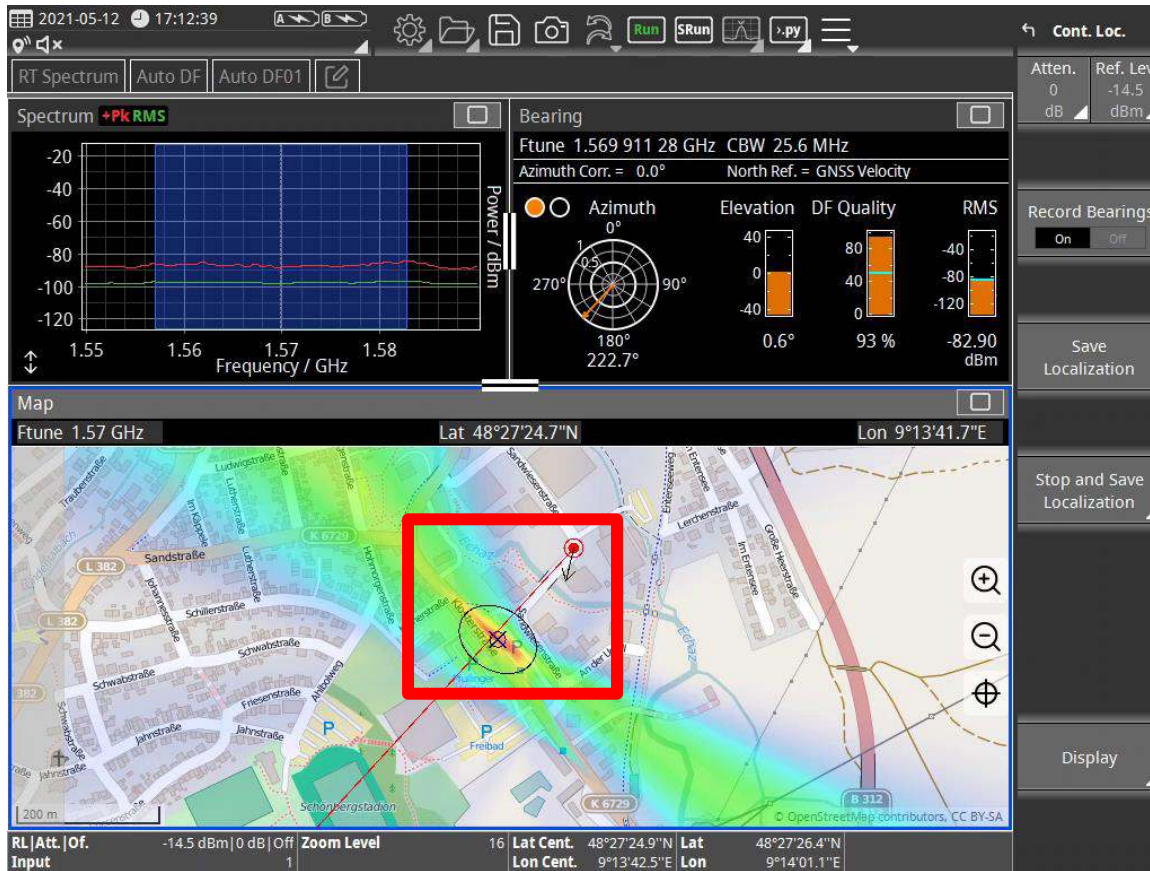


- Immediately after passing the parking lot, the open red triangle is fading away and turns into a red dot.

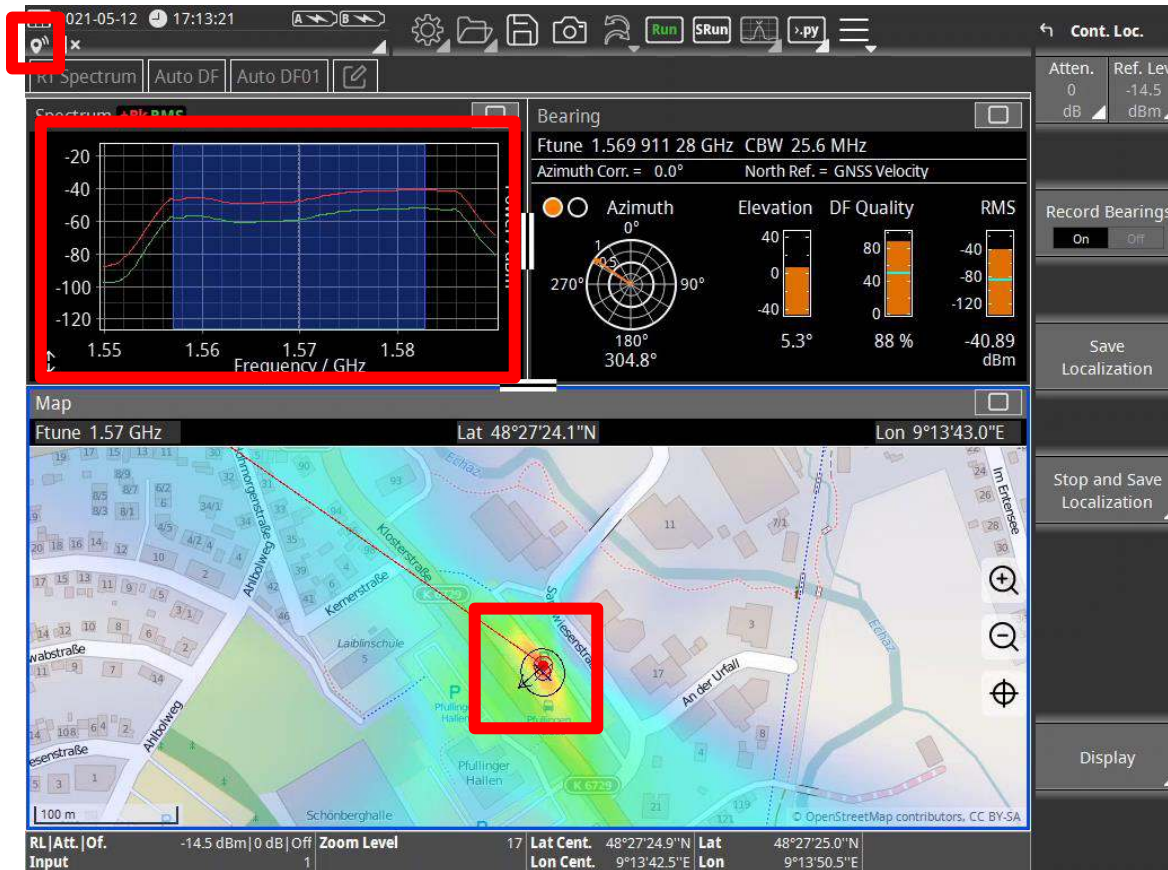


# The Hunt

- For verification, the parking lot is approached from one more direction

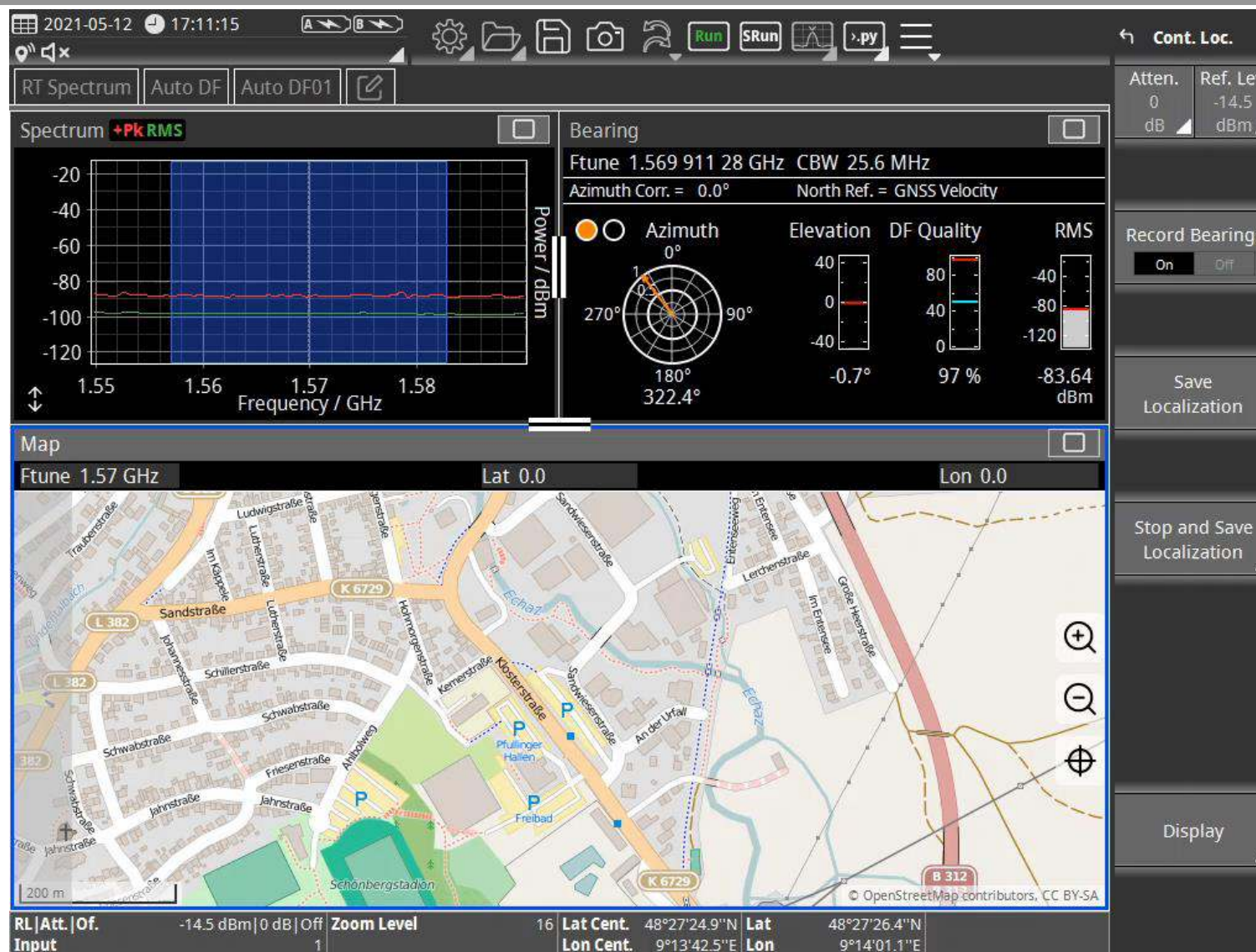


- And even when parking directly next to the suspicious car, the GPS of the SignalShark/ADFA remains unaffected





# The full drive, recorded by screen-capture software





# The object under suspicion was found

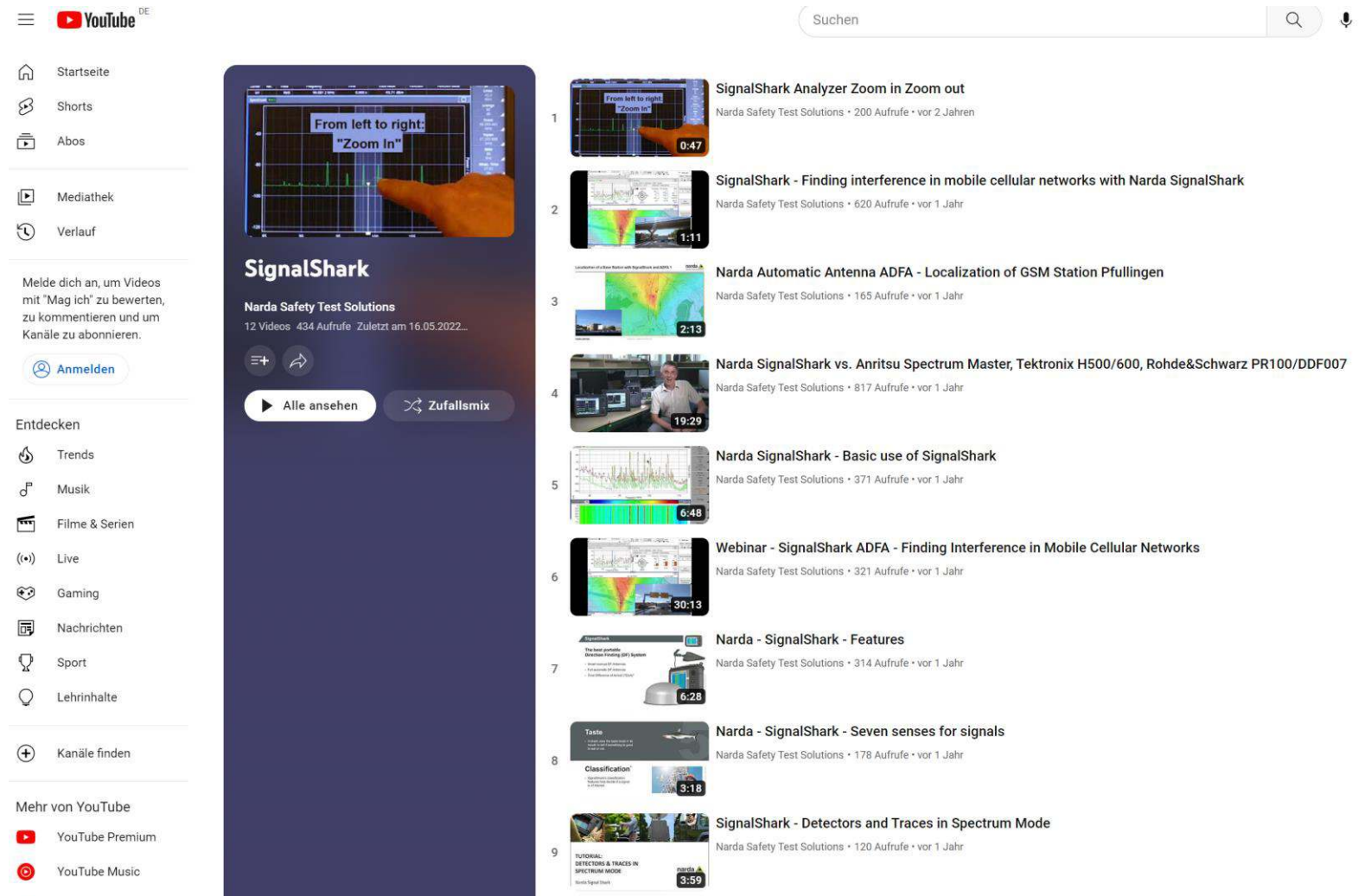
- A look through the side window of a parked car confirms the suspicion, there is something in the cigarette lighter.



- Is an automatic antenna as Narda ADFA/SignalShark sensitive enough to detect a small GPS-jammer?
  - **Yes, even such a small jammer installed inside a faraday cage (car) can be detected by SignalShark/ADFA**
- Which is the maximum distance?
  - **For this specific situation appr. 200 meters**
- If a jammer is active, is ADFA/SignalShark still able to operate?
  - **Yes**

# Don't forget:

- More videos available on our YouTube channel.
- Please subscribe to our YouTube and LinkedIn channel.
- [www.narda-sts.com](http://www.narda-sts.com)



The screenshot displays the YouTube channel for Narda Safety Test Solutions. The channel banner features a video titled "SignalShark" with a subtitle "From left to right: 'Zoom In'". Below the banner, the channel name "Narda Safety Test Solutions" is shown, along with statistics: 12 Videos, 434 Aufrufe, and a last update on 16.05.2022. A list of 9 videos is presented on the right side of the page, each with a thumbnail, title, and view count. The left sidebar contains navigation links: Startseite, Shorts, Abos, Mediathek, and Verlauf. At the bottom of the sidebar, there are links to "Anmelden" and "Entdecken" (Trends, Musik, Filme & Serien, Live, Gaming, Nachrichten, Sport, Lehrinhalte). The "Mehr von YouTube" section at the bottom includes links to YouTube Premium and YouTube Music.

Suchen

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SignalShark - Finding interference in mobile cellular networks with Narda SignalShark  
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Narda Automatic Antenna ADFA - Localization of GSM Station Pfullingen  
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Narda SignalShark vs. Anritsu Spectrum Master, Tektronix H500/600, Rohde&Schwarz PR100/DDF007  
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Narda SignalShark - Basic use of SignalShark  
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Webinar - SignalShark ADFA - Finding Interference in Mobile Cellular Networks  
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