Experience with car GPS signal jammer from Slovakia

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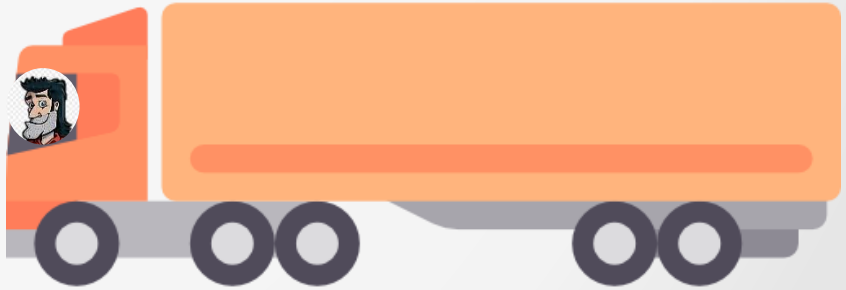
EUPOS
European Position Determination System

7th EUPOS Council and Technical Meeting

November 9-10 2021, Bucharest, Romania, Online

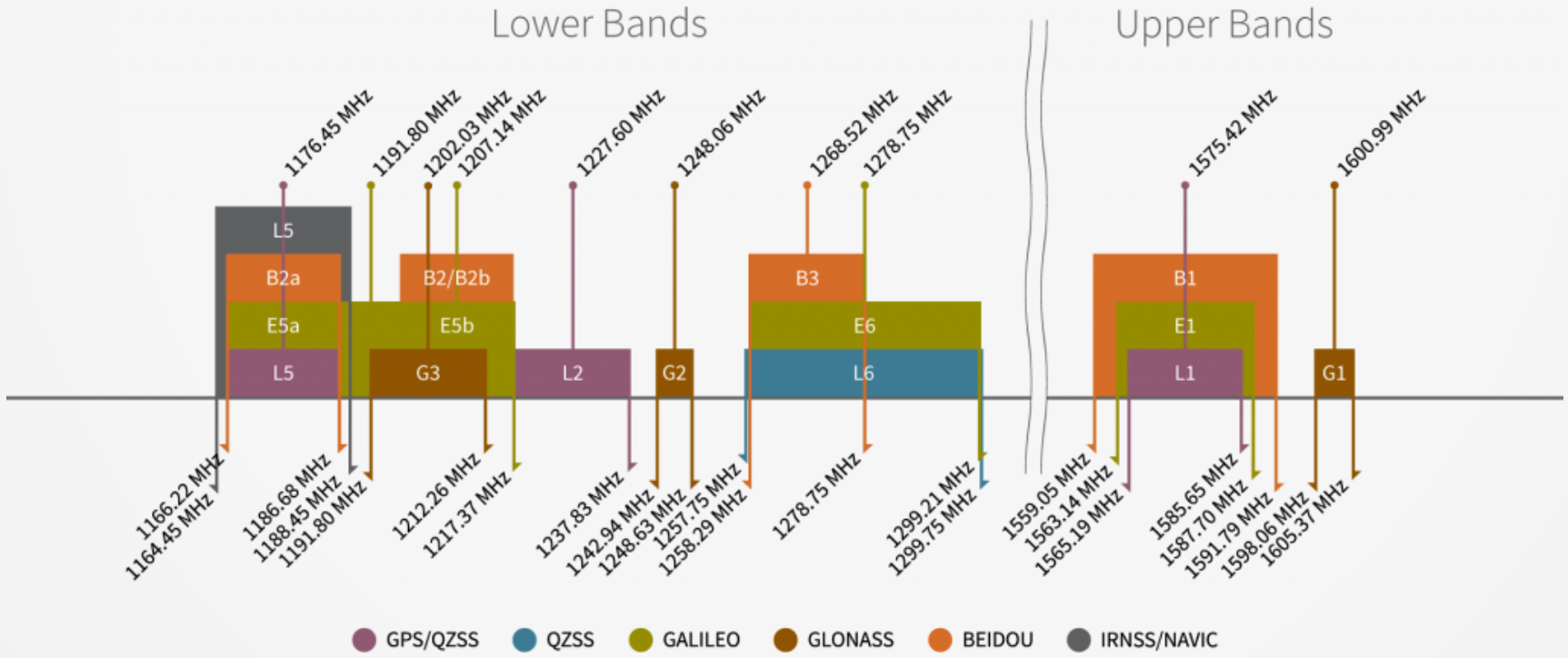
Motivation

- Users report a problem with RTK measurement near by road
- Possible reason → use of GPS jammer in trucks
- Trucks in Slovakia pay a toll based on the traveled kilometers
- Traveled kilometers are recorder with GPS navigation

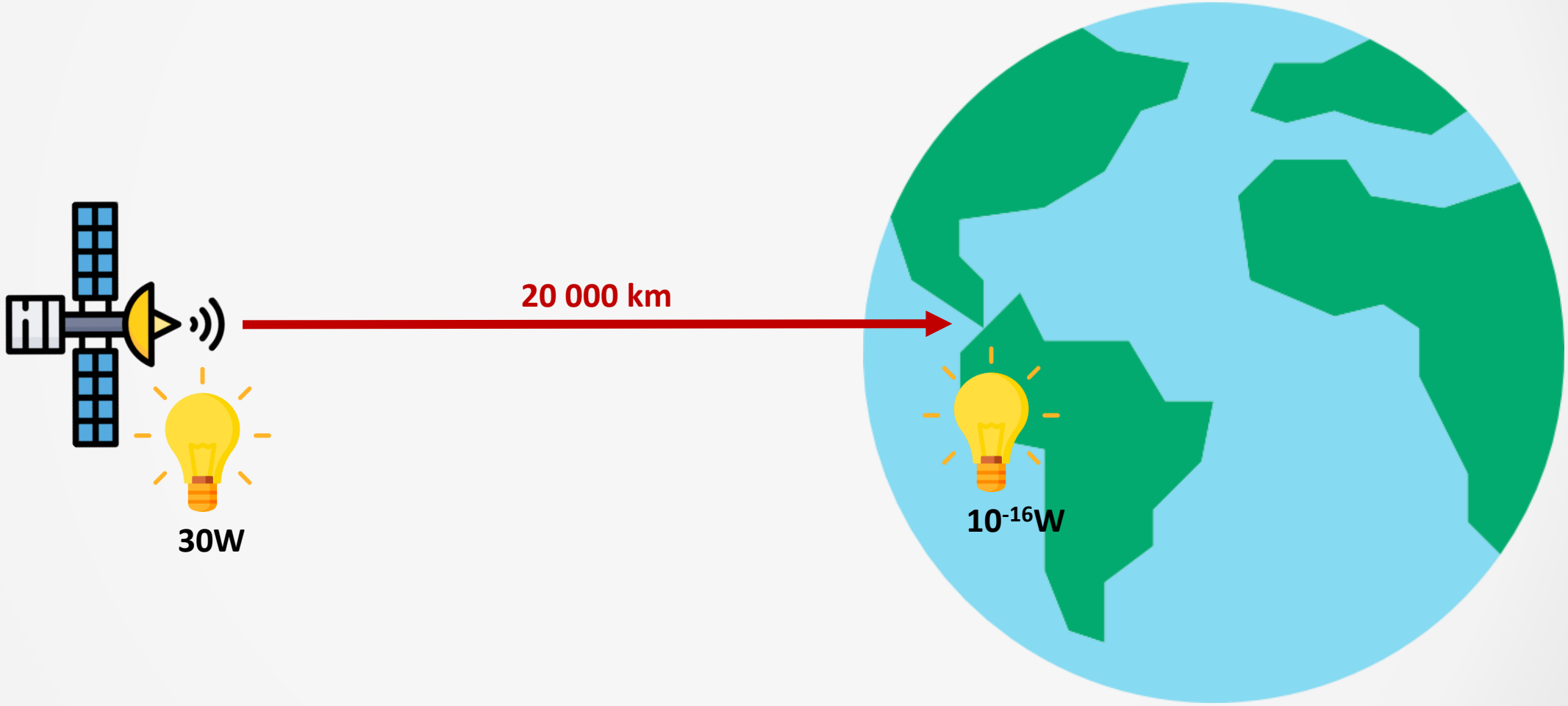


GPS/GNSS signál

- GNSS signals are transmitted on reserved frequencies
- Reserved frequencies are defined in the National Table of Frequency Spectrum



GPS/GNSS signal



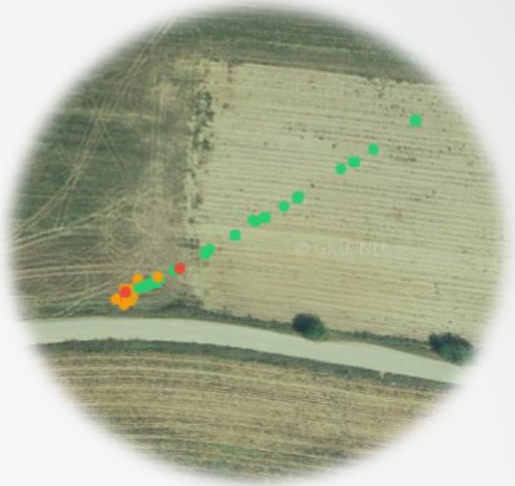
GNSS signal jammer

- It transmits noise at the same frequencies as the GNSS signal
- Its use is prohibited by Government Decree no. 443/2001 Coll.
- Its marketing (sales and distribution) is also prohibited
- Nevertheless, jammers are available on our market

GNSS signal jammer

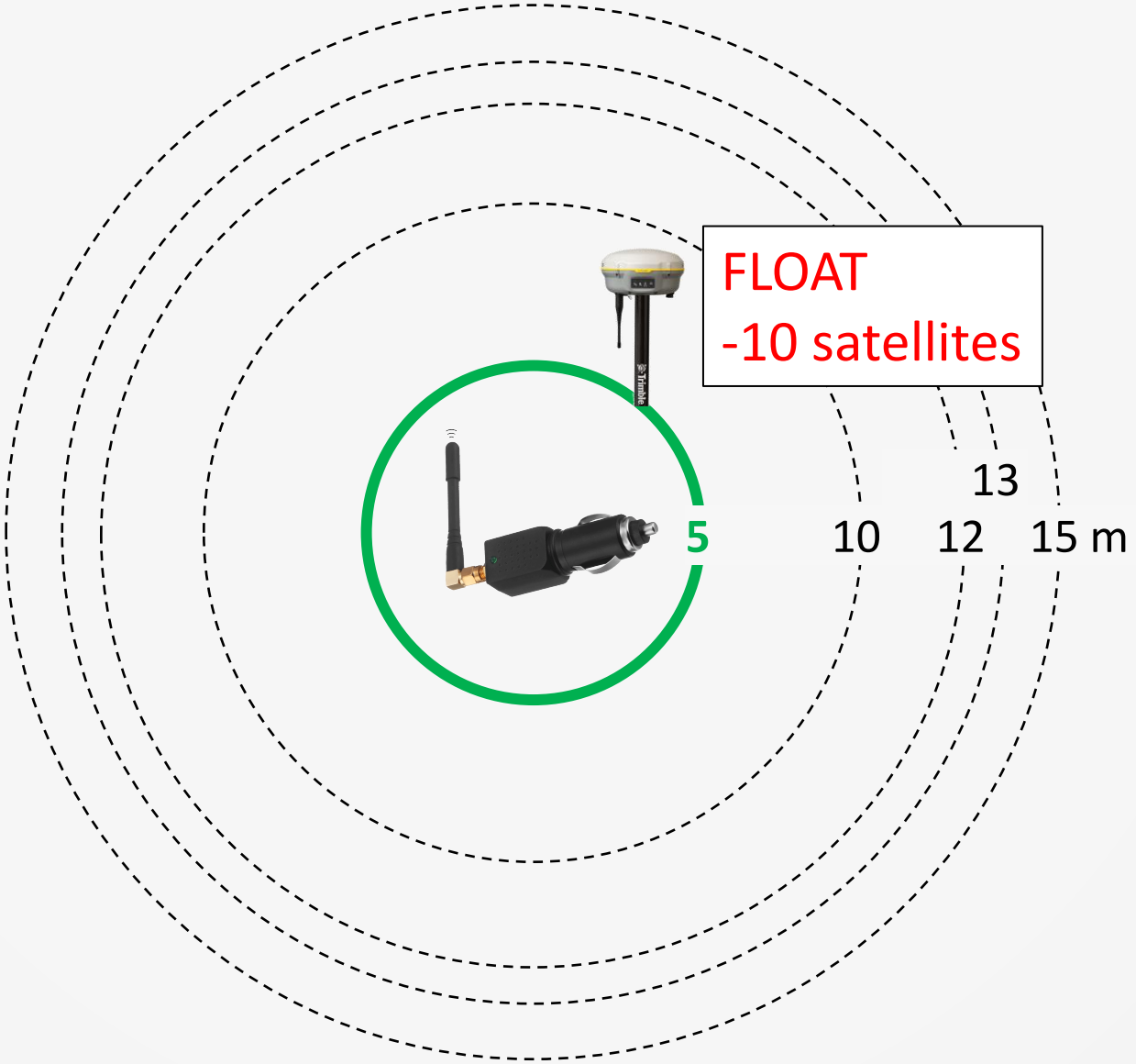
- Weight: 50 g
- Power supply: DC 12 V
- Power: 5 W
- Jamming range: 3-6 meters
- Frequency: 1575,42 MHz
- Blocking: GPS signal

Test of jamming range



- RTK measurement with ideal conditions
- Rover Trimble R8: GPS, GLONASS, Galileo

Test of jamming range 5 m – 15 m



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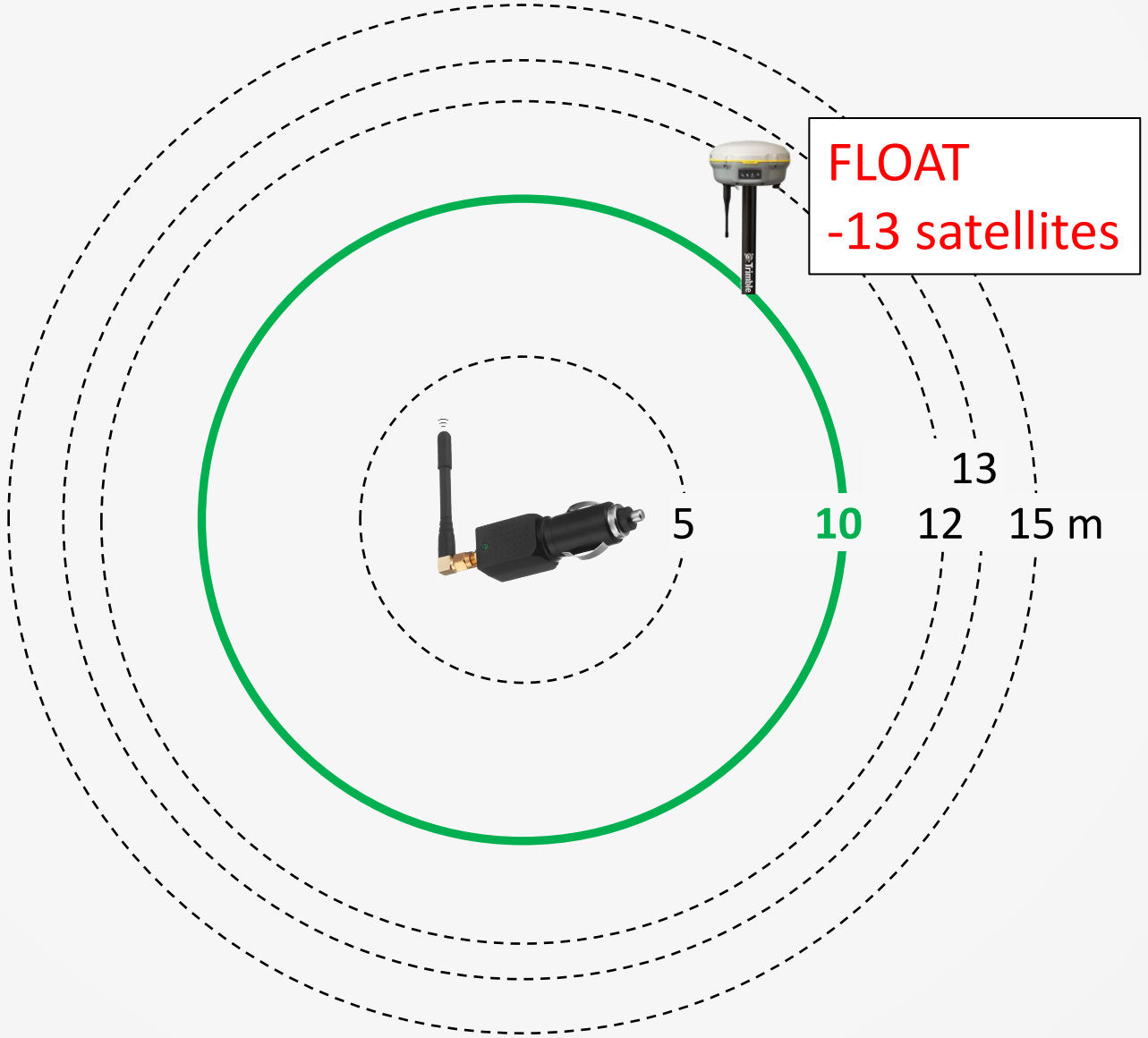

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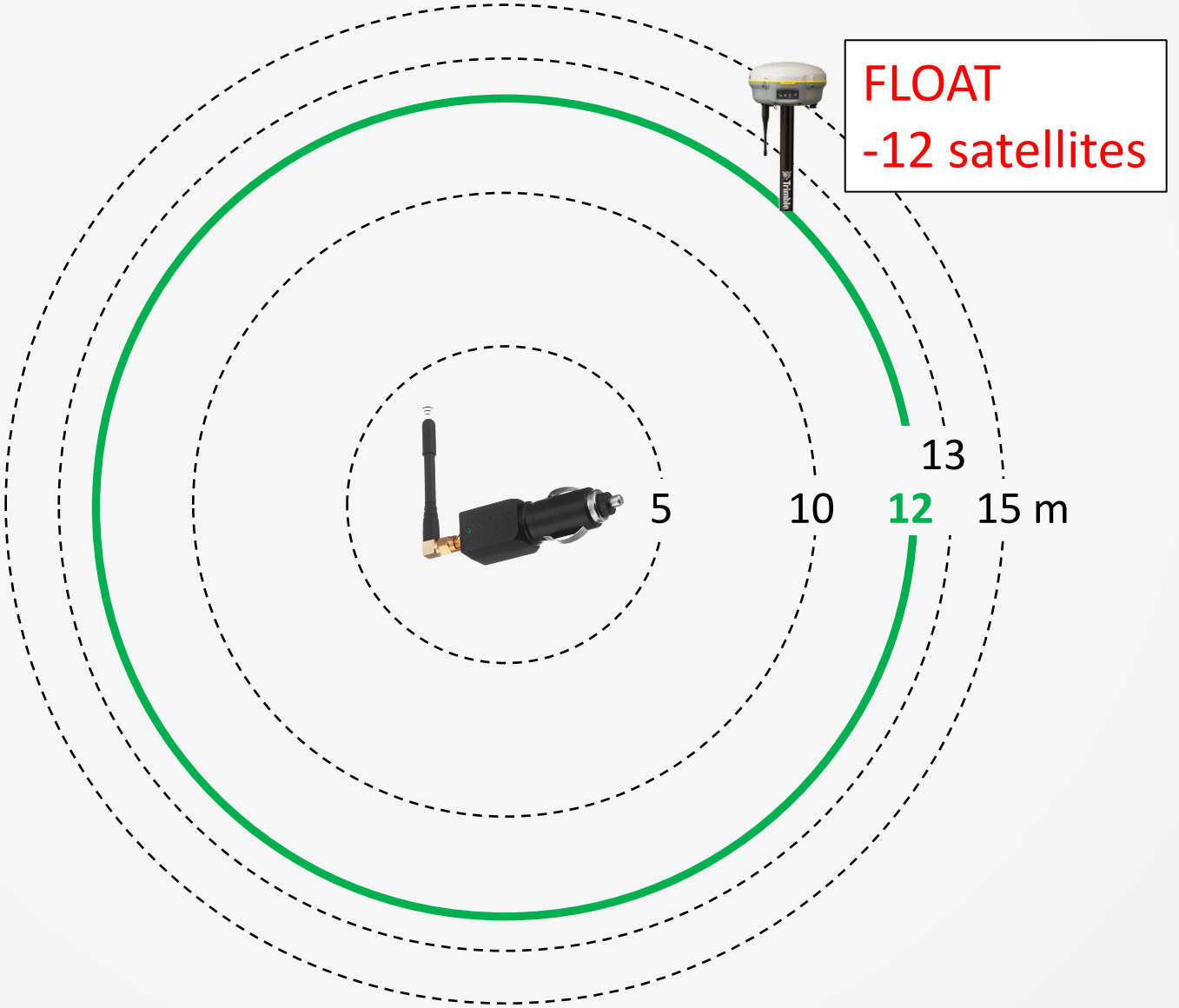
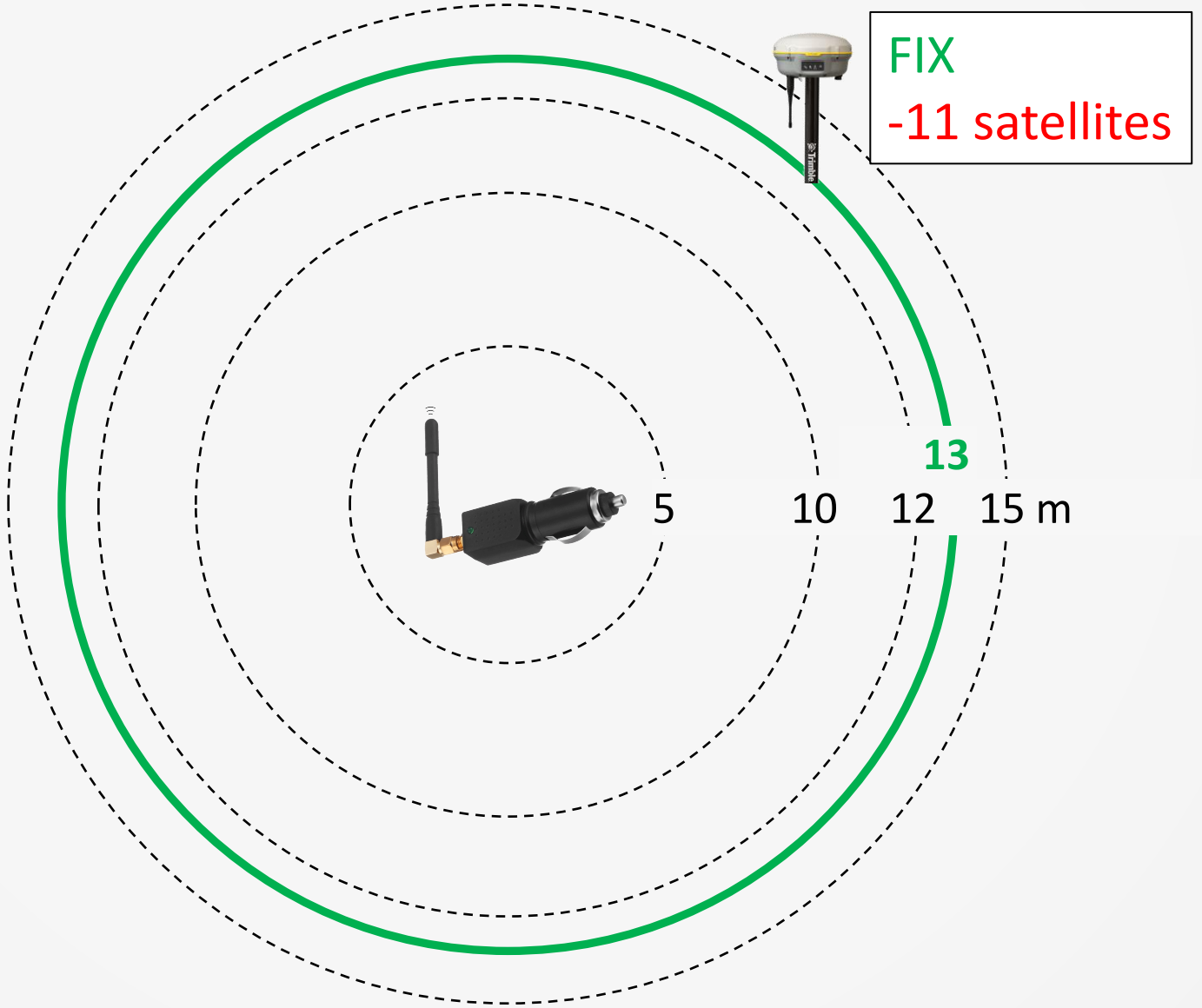


Test of jamming range 5 m – 15 m



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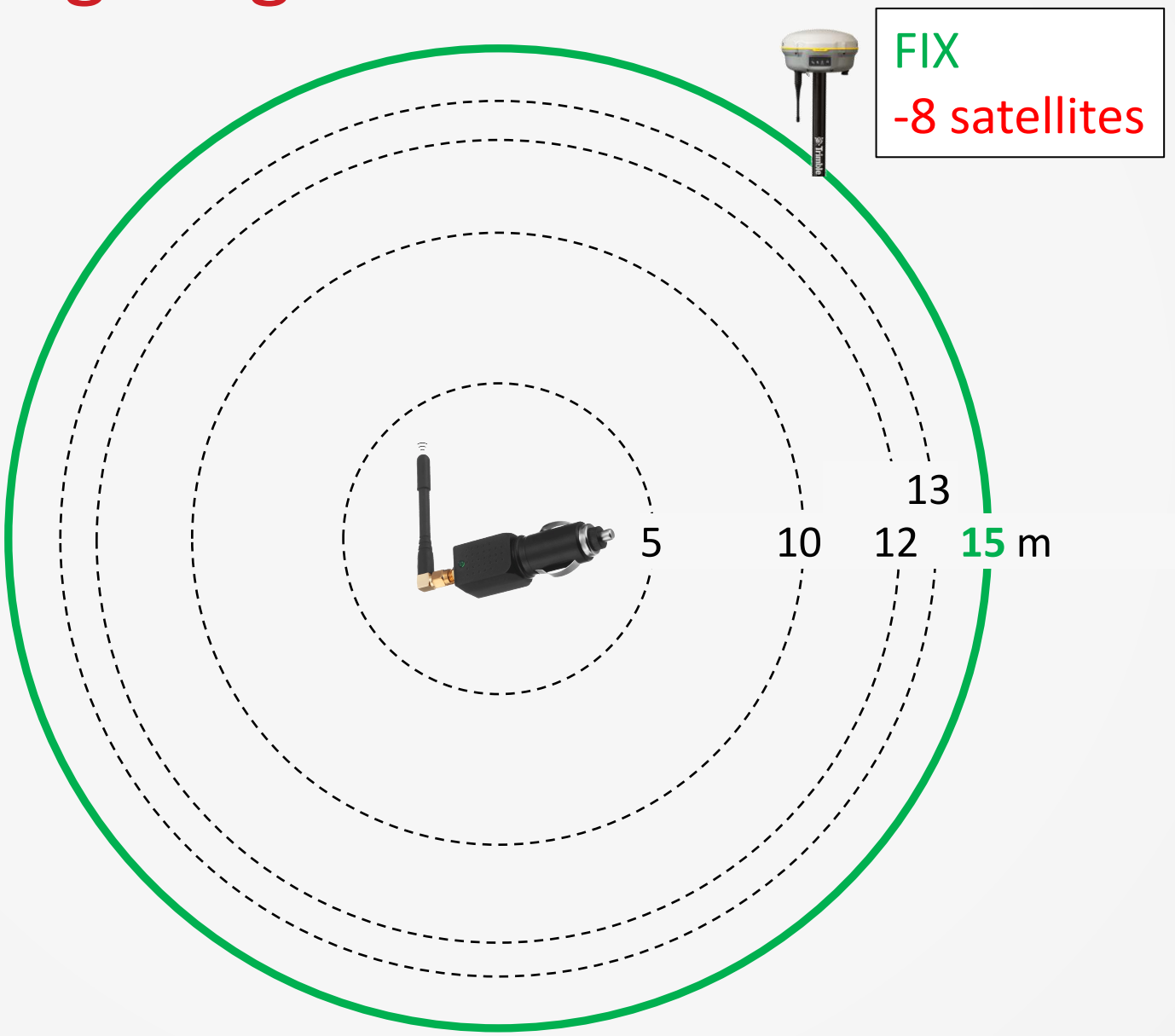
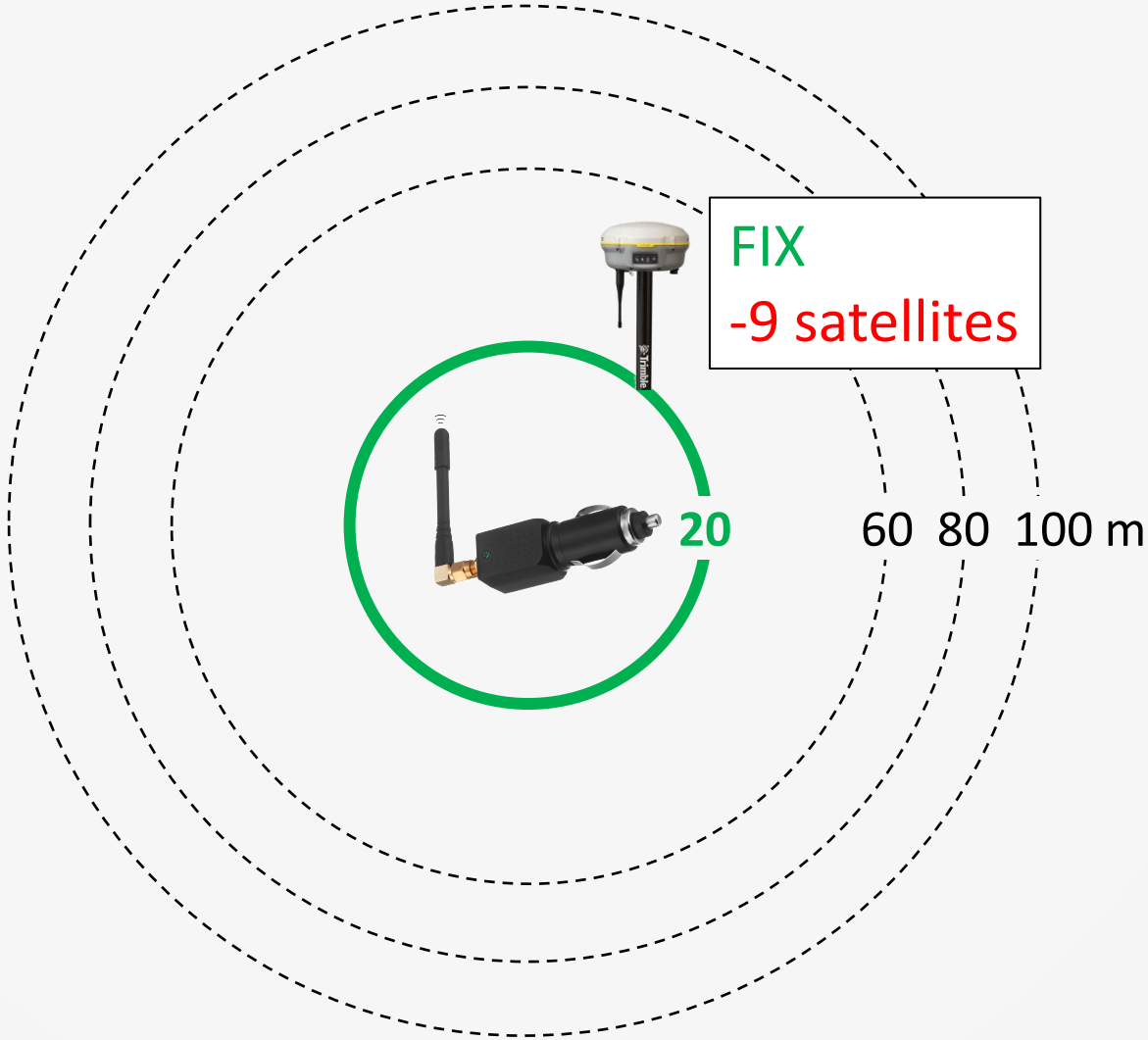
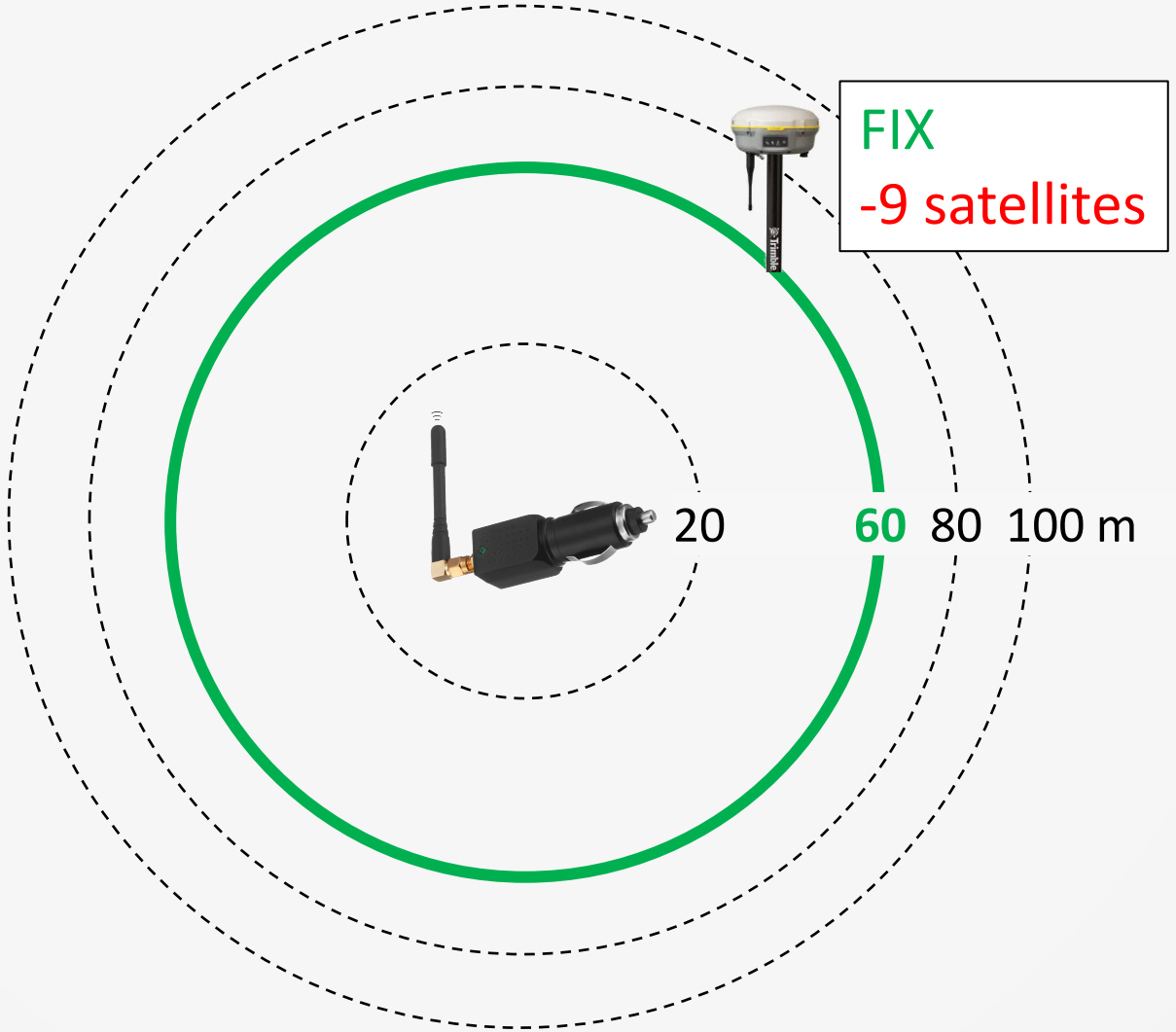


Test of jamming range 20 m – 100 m



Test of jamming range 20 m – 100 m



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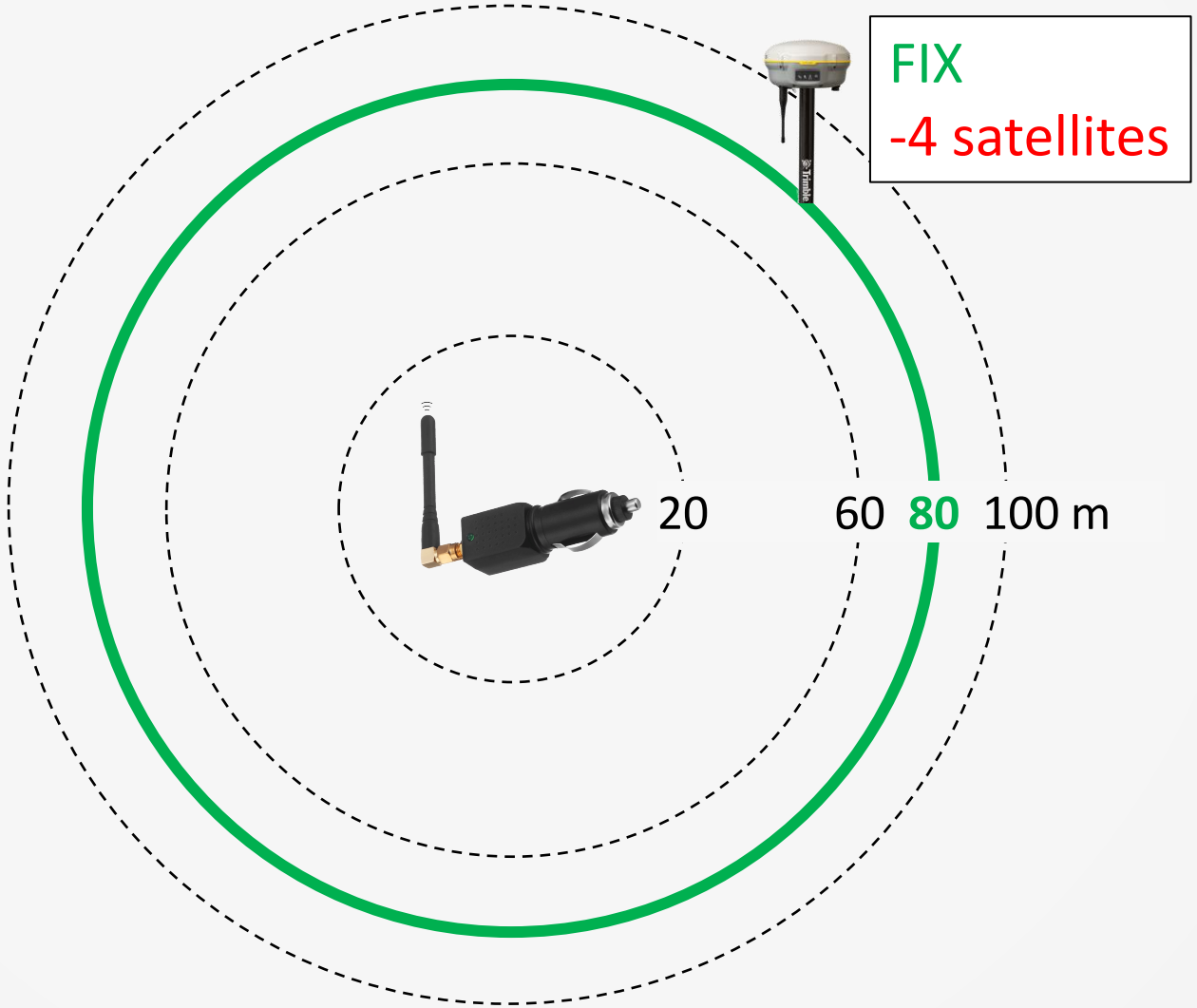

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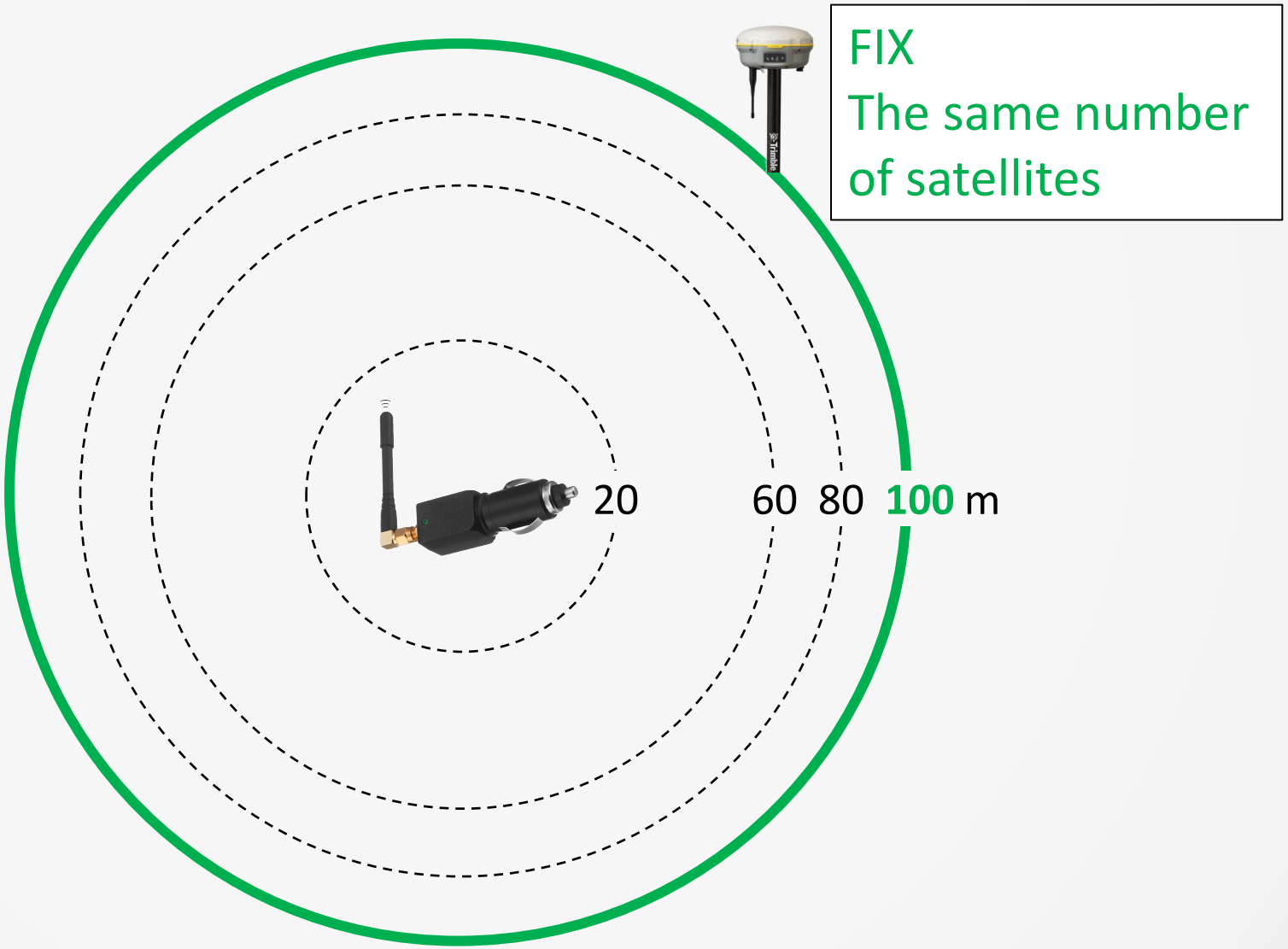
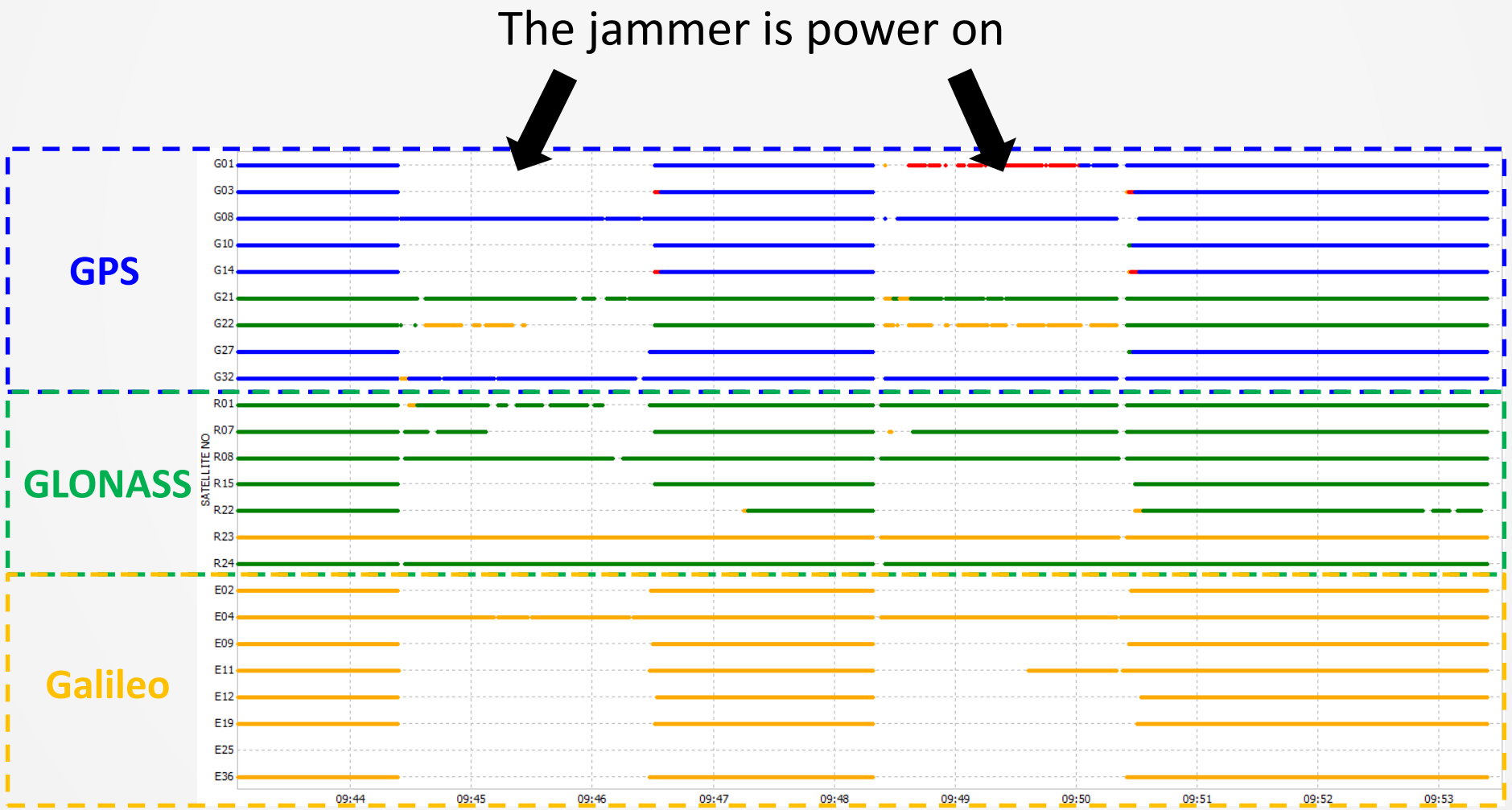


Influence of jamming on satellite systems



Tha jammer impact on static measurement

- 10 minutes static measurement
- 5 meter from the jammer

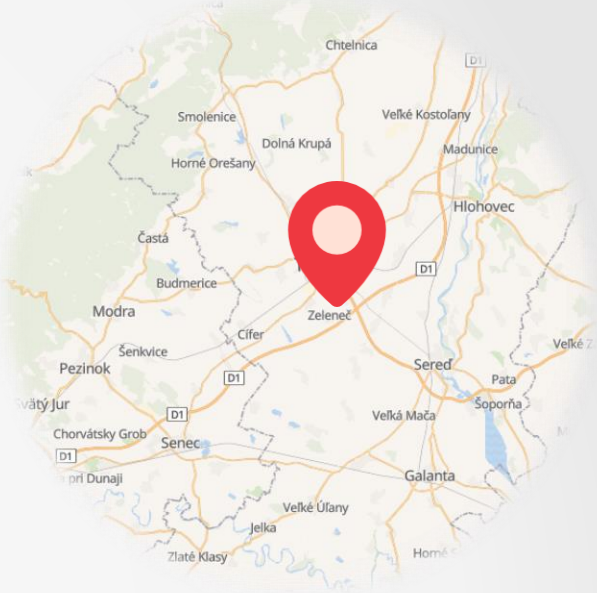
Observation length	Jamming length	Δp	Δh
10 min	10 min (100%)	2 cm	6 cm
10 min	5 min (50%)	0,6 cm	2 cm

Control of the use of jammers

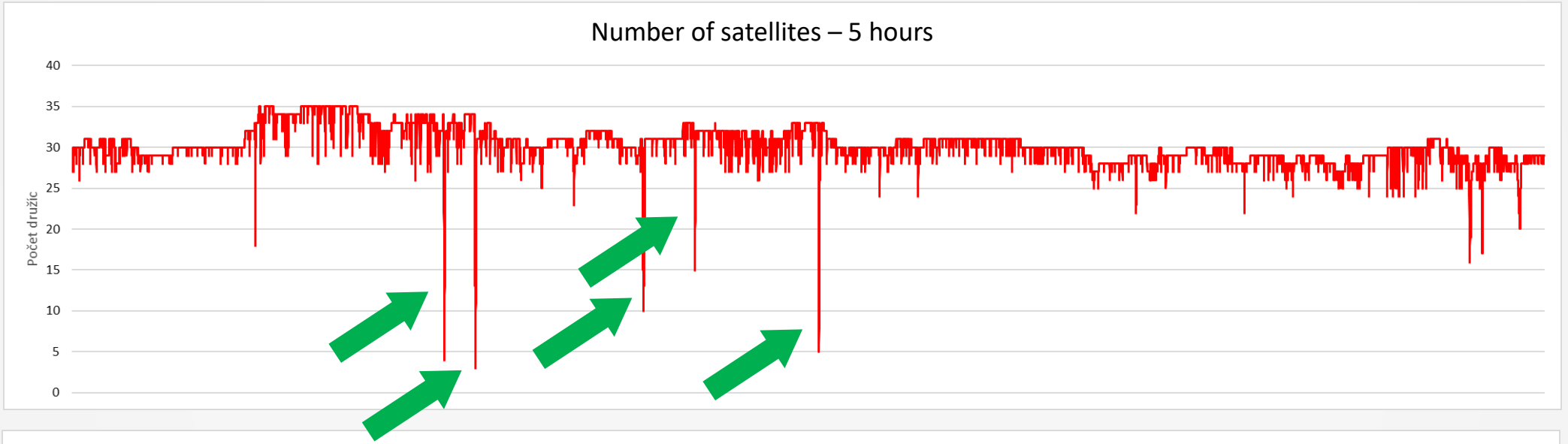
- The control is performed by the Office for the Regulation of Electronic Communications and Postal Services
- In the last 5 years (2016-2020) were detected only 2 GNSS signal jammers

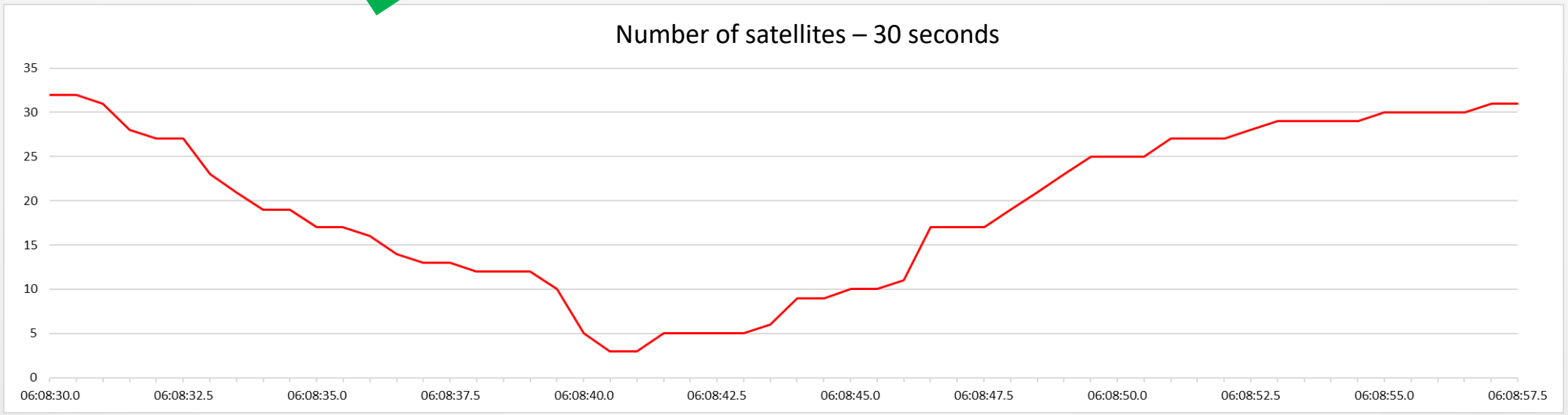
Control of the use of jammers

- 5-hours static measurement near the highway



Control of the use of jammers





Conclusion

- The test showed:
  - ✓ jamming of GNSS signals at all frequencies and for all satellite systems,
  - ✓ reduction of the number of satellites to a distance of 80 meters,
  - ✓ inability to achieve a fix RTK solution within a distance of 12 meters,
  - ✓ negative impact on the calculation of coordinates by the static method,
  - ✓ active use of jammers in trucks.

Thank you for your attention

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