RANLOS

PB100-4

PRODUCT BROCHURE

RanLOS test solutions



RanLOS BeamForce 42

RanLOS BeamForce 42 is an accurate, cost-effective, and easy-to-use test system enabling OTA and antenna performance measurements. This innovative solution is portable and can be used both in existing EMC chambers as well as test tents.



May the BeamForce be with you

Key features:

- Compact far-field over-the-air (OTA) test system based on the Random Line-of-Sight technology
- Outstanding performance versus price
- Enables measurements of relevant standards, such as 4G, 5G, V2X, and WiFi
- Frequency band 0.70 to 6 GHz covered by three antenna arrays (upgradeable)
- Portable system that can be rolled into existing EMC chambers or other test facilities
- Complemented by RanLOS BeamLab measurement software, enabling fast and easy testing

RanLOS BeamForce 42 consists of a cylindrical reflector fed by a dual polarized passive linear antenna array. The test system provides two operational modes: Passive for antenna radiation pattern measurements and active for communication performance testing, for example, throughput.

RanLOS also provides an advanced measurement software, RanLOS BeamLab, for controlling instruments and positioners. Visualization in 1D, 2D and 3D, and analysis of measurement data can conveniently be done directly in the software. A large number of instruments, turntables and other test equipment are compatible with RanLOS BeamLab which enables quick and easy handling of the total test process.

In summary, RanLOS BeamForce 42 is an accurate and cost-effective solution for measuring both antenna and OTA performance.

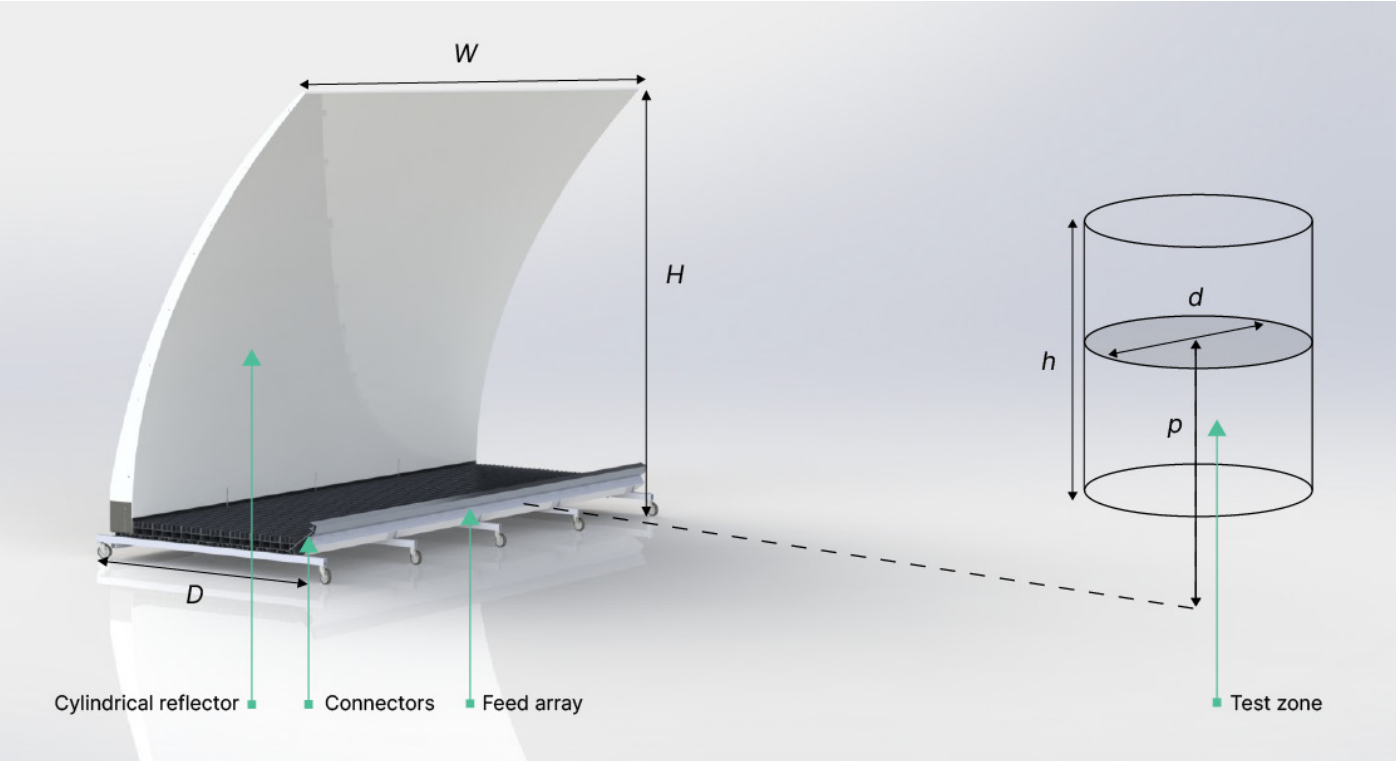
Specifications

RanLOS BeamForce 42

Frequency range [1]		0.70 GHz to 6 GHz (Upgradable to higher frequencies)
Polarization	Feed antenna	Dual polarized
RF connectors	Feed antenna	2 x N-type (female)
Impedance	Feed antenna	50 Ω
Quiet zone quality		
STD (cylindrical volume) [2]	Amplitude	< 1.6 dB
STD (cylindrical volume) [2]	Phase	< 10°
Peak-to-peak (circular area) [3]	Amplitude	< 3 dB
Peak-to-peak (circular area) [3]	Phase	< 20°
Repeatability [4]	Amplitude	< 0.15 dB
Dimensions	D x H x W	1.9 m x 3.4 m x 4.4 m (reflector width 4.2 m)
Weight		Approx. 450 kg

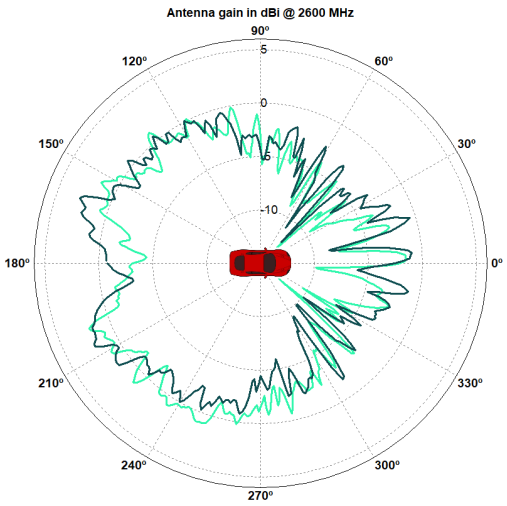
1. The frequency range is covered by using three different antenna arrays, sectioned as follows, 0.75 GHz to 1.5 GHz, 1.5 GHz to 3 GHz and 3 GHz to 6 GHz. Upgradeable to higher frequencies.
2. The standard deviation is calculated in a cylindrical test volume with d = 1.5 m, h = 1.4 m, and p = 1.3 m, see the figure on next page.
3. The peak-to-peak variation is calculated in a circular test plane with d = 1.5 m and h = 0 m, and p = 1.4 m, see the figure on next page.
4. Repeatability based on an MSA analysis at 1.7 GHz done at a customer site with the RanLOS system.

Figure related to specifications



RanLOS vs NF-FF test facility

Measurements of an antenna mounted on the roof of a vehicle. Comparison between measurements using the RanLOS test system and an accredited lab using a NF-FF system.



RanLOS Accredited test facility



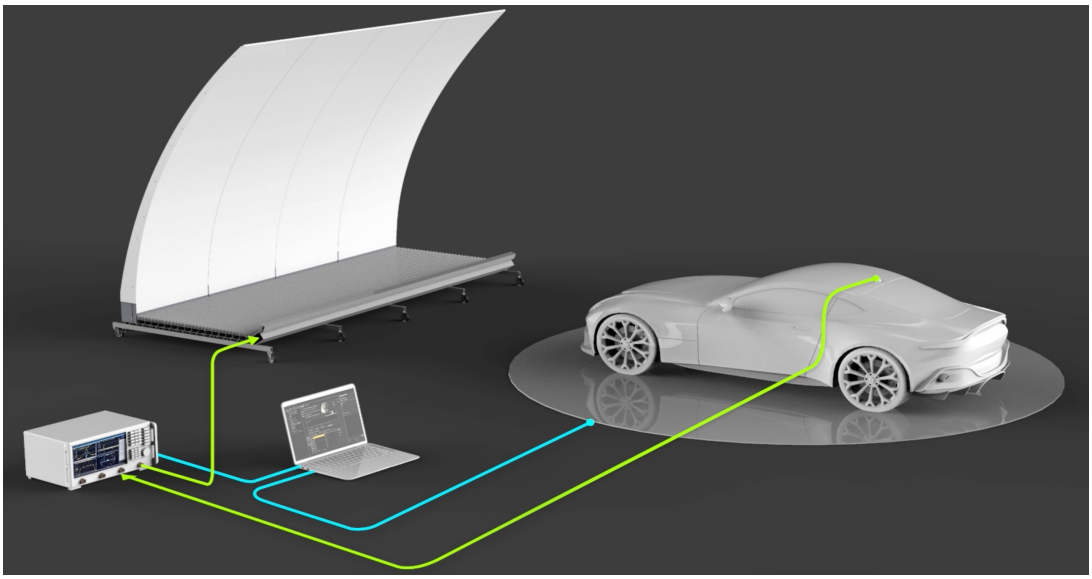


Measurements done during SIVERT - a FFI-Vinnova project

Measurement setups

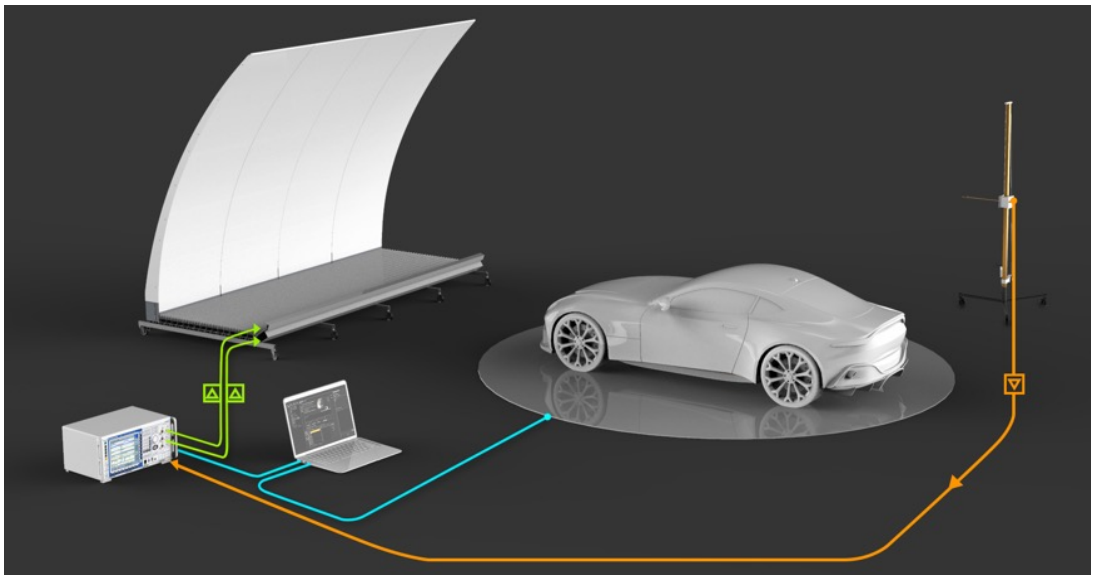
Antenna performance measurements

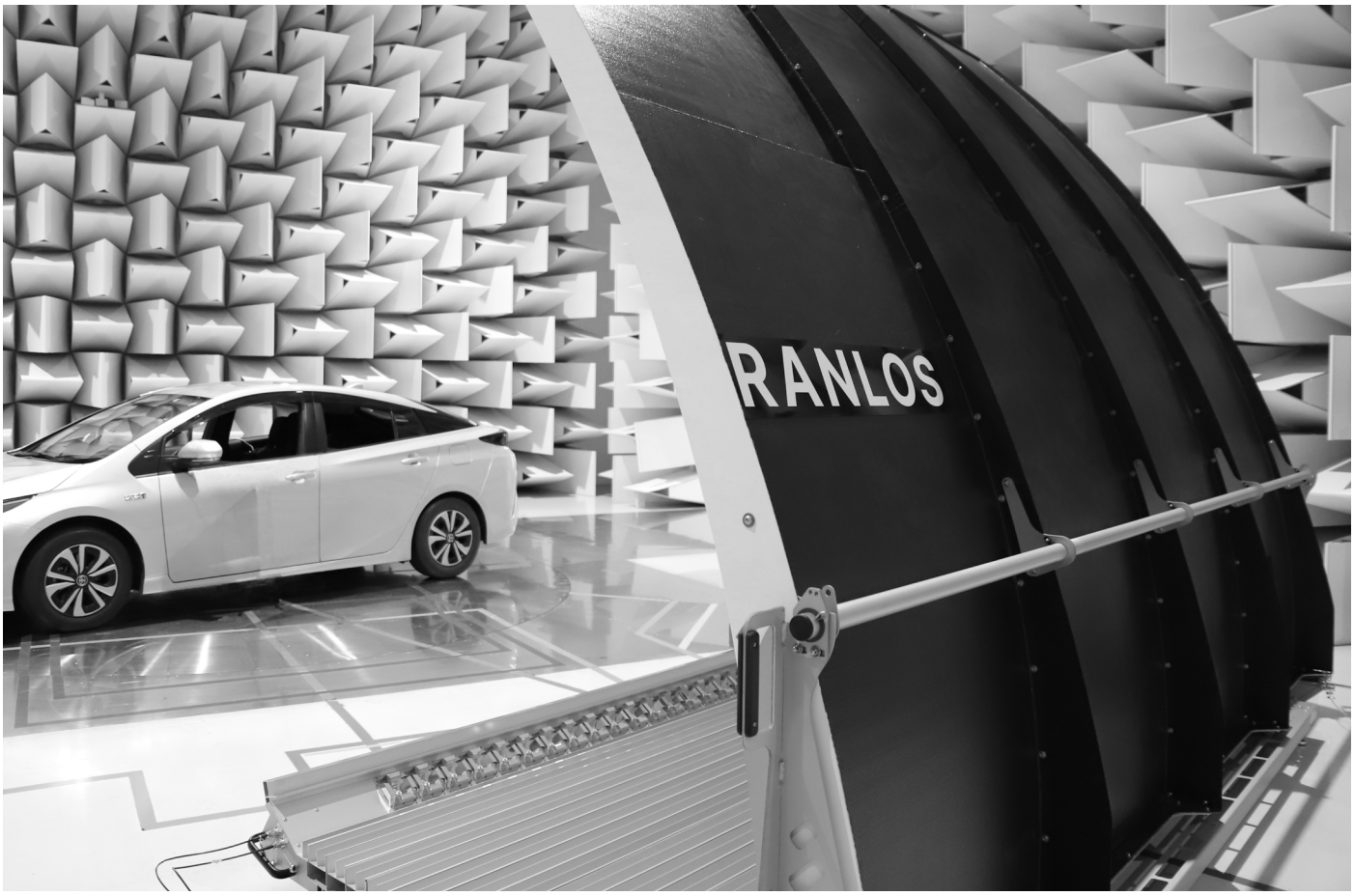
The setup for antenna performance measurements uses a Vector Network Analyzer to collect the data. The instrument and turntable are controlled by RanLOS BeamLab. It is possible to measure both polarizations simultaneously by using a 4-port instrument.

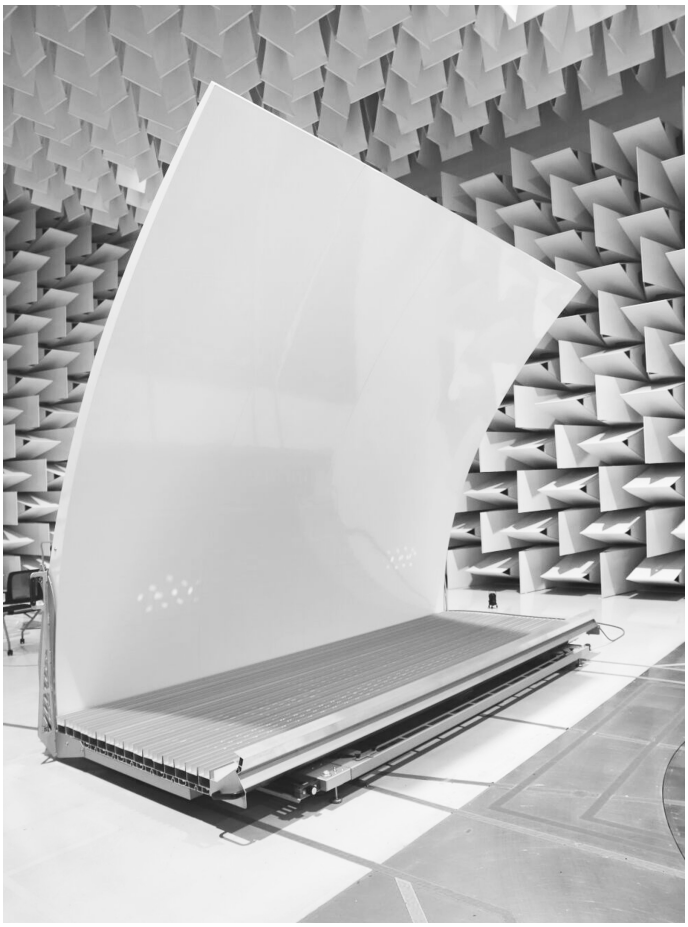


OTA communications performance measurements

The setup for OTA measurements uses a Communication Tester that acts as the base station and feeds the dual polarized antenna array. A separate uplink antenna is used to keep the connection. The instrument and turntable are controlled by RanLOS BeamLab. Up to 2×2 MIMO measurements can be performed using a single RanLOS BeamForce 42.




RANLOS











RanLOS BeamForce 21

RanLOS BeamForce 21 is a compact, portable test system designed for accurate and cost-efficient OTA and antenna performance measurements. With the same core functionality as BeamForce 42, this smaller model is ideal for flexible setups in both EMC chambers and mobile test environments.



Engineered for flexible testing. Anywhere.

Key features:

- Compact OTA test system based on Random Line-of-Sight technology
- Optimized for flexible use in limited spaces and mobile test setups
- Enables measurements of relevant standards, such as 4G, 5G, V2X, and WiFi
- Frequency band 0.70 to 6 GHz covered by three antenna arrays (upgradeable)
- Portable system that can be rolled into existing EMC chambers or other test facilities
- Complemented by RanLOS BeamLab measurement software

RanLOS BeamForce 21 is built around a cylindrical reflector and a dual polarized passive linear antenna array, just like the BeamForce 42. It offers two operational modes:

- Passive mode for antenna radiation pattern measurements
- Active mode for communication performance testing, such as throughput.

The system is controlled via RanLOS BeamLab, an advanced software platform for instrument and positioner control, as well as data visualization and analysis in 1D, 2D, and 3D. BeamLab supports a wide range of measurement equipment, enabling efficient integration into existing test setups.

With its smaller footprint and full compatibility with the RanLOS ecosystem, BeamForce 21 offers a highly portable and scalable solution for antenna and OTA performance testing – without compromising on measurement quality.

Specifications

Specifications for RanLOS BeamForce 21

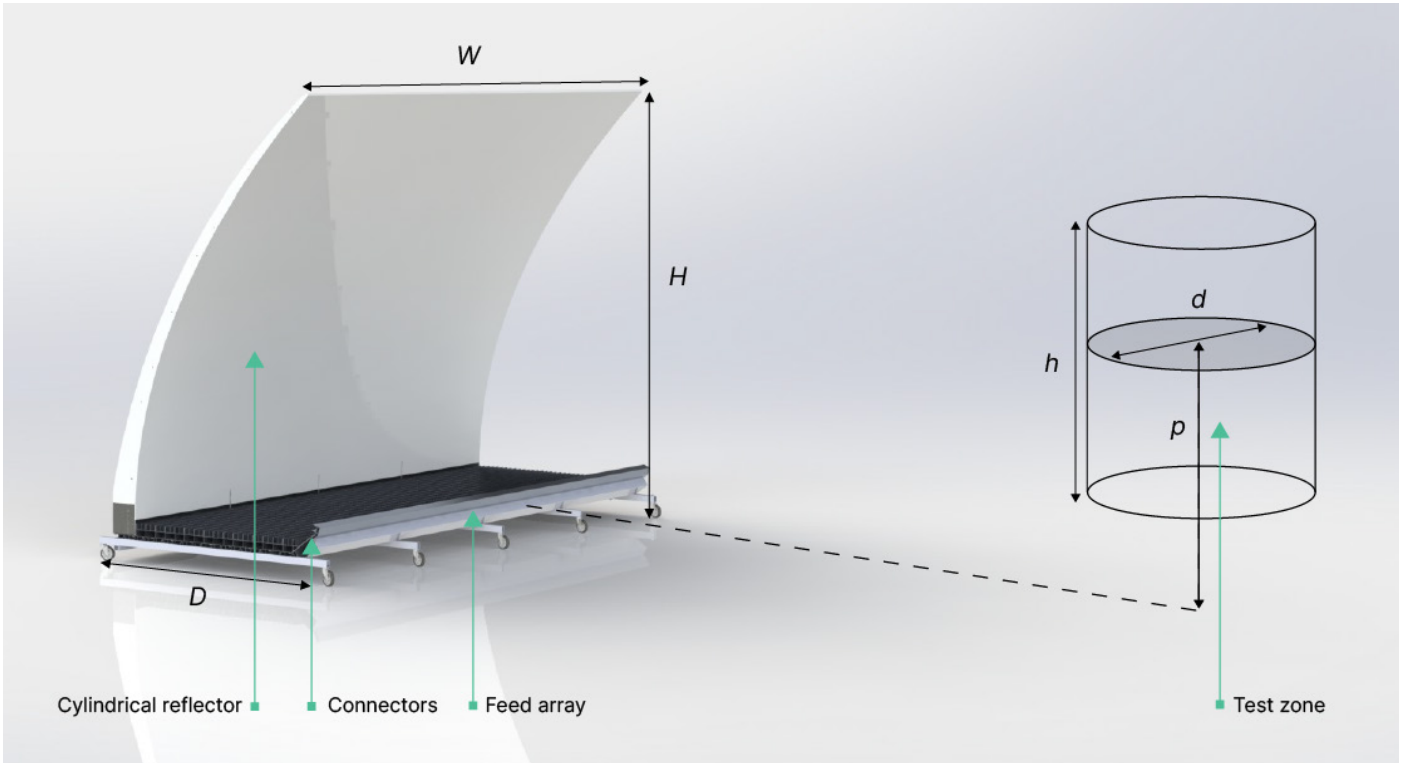
Frequency range [1]		0.70 GHz to 6 GHz (Upgradable to higher frequencies)
Polarization	Feed antenna	Dual polarized
RF connectors	Feed antenna	2 x N-type (female)
Impedance	Feed antenna	50 Ω
Quiet zone quality		
STD (cylindrical volume) [2]	Amplitude	< 1.5 dB (BA0715-21*) & (BA1530-21*) < 2.0 dB (BA3060-21*)
STD (cylindrical volume) [2]	Phase	< 10 deg (BA0715-21*) & (BA1530-21*) < 15 deg (BA3060-21*)
Peak-to-peak (circular area) [3]	Amplitude	< 1.5 dB (BA0715-21*) < 3.0 dB (BA1530-21*) < 4.5 dB (BA3060-21*)
Peak-to-peak (circular area) [3]	Phase	< 25º
Dimensions	D x H x W	1.3 m x 2.3 m x 2.3 m (reflector width 2.1 m)
Weight		Approx. 200 kg

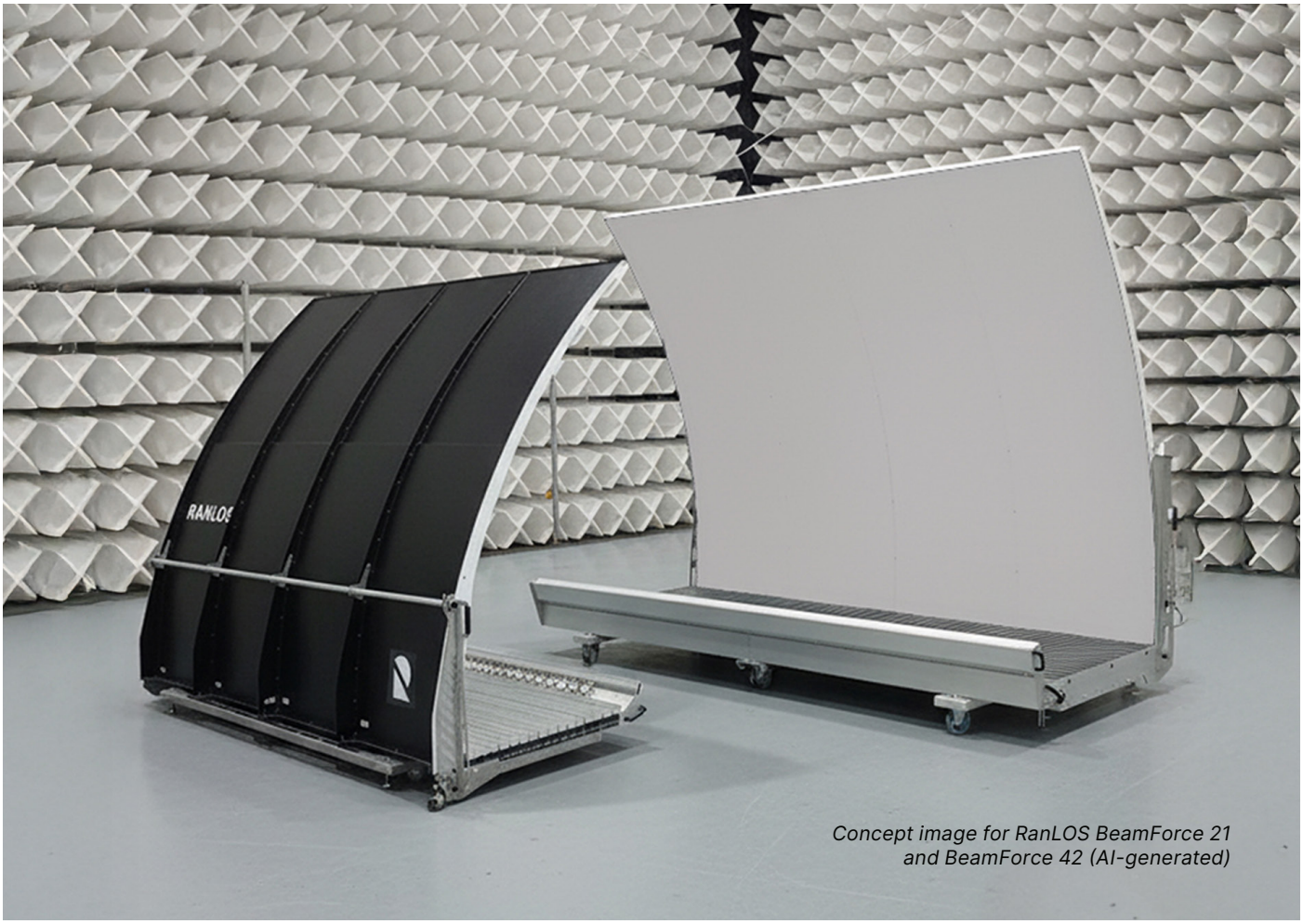
1. The frequency range is covered by using three different antenna arrays, sectioned as follows, 0.70 GHz to 1.5 GHz, 1.5 GHz to 3 GHz and 3 GHz to 6 GHz. Upgradeable to higher frequencies.
2. The standard deviation is calculated for a cylindrical test volume with d = 0.8 m, h = 0.6 m, and p = 1.1 m, see the figure on the next page.
3. The peak-to-peak variation is calculated for a circular test plane with d = 0.8 m, and h = 0 m, and p = 1.1 m, see the figure on the next page.

Note: The specification data are preliminary.

*BA = BeamArray. 0715 = Frequency range. 21 = BeamForce 21. For example, BA0715-21 = BeamArray 0.7 - 1.5 GHz for BeamForce 21, etc.

Figure related to specifications



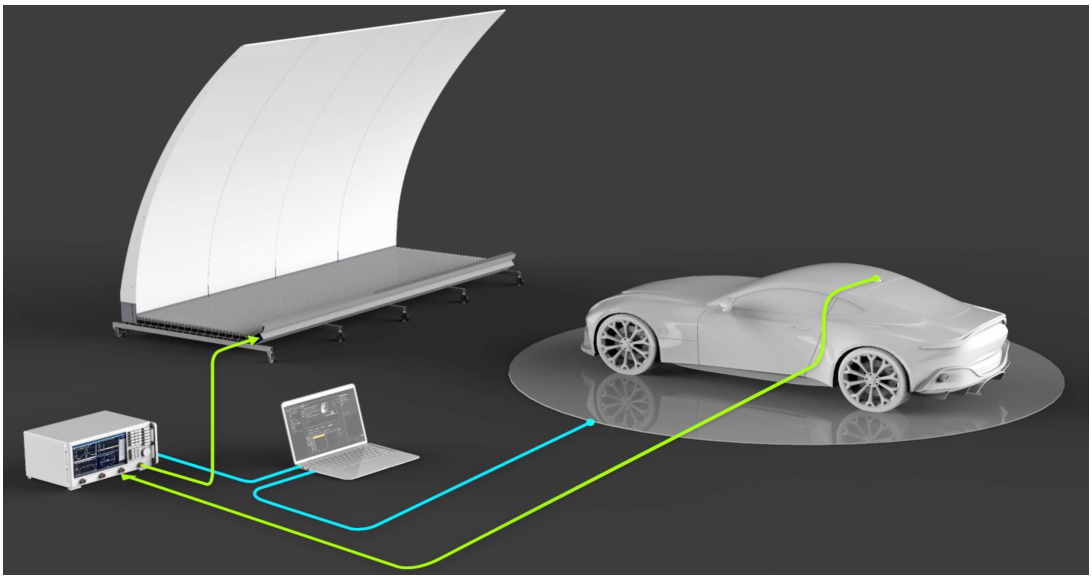


Concept image for RanLOS BeamForce 21 and BeamForce 42 (AI-generated)

Measurement setups

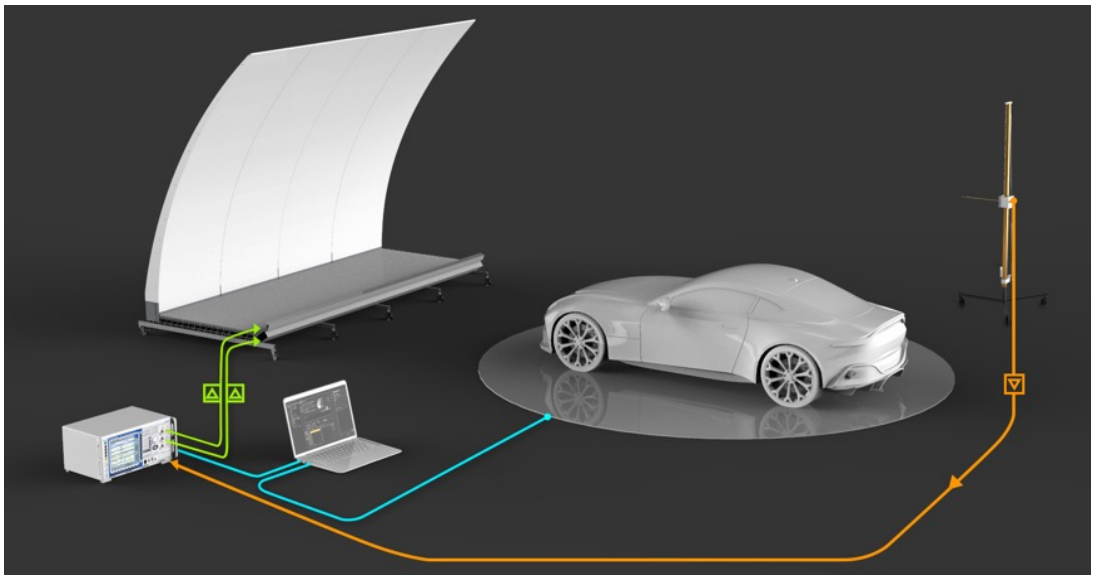
Antenna performance measurements

The setup for antenna performance measurements uses a Vector Network Analyzer to collect the data. The instrument and turntable are controlled by RanLOS BeamLab. It is possible to measure both polarizations simultaneously by using a 4-port instrument.



OTA communications performance measurements

The setup for OTA measurements uses a Communication Tester that acts as the base station and feeds the dual polarized antenna array. A separate uplink antenna is used to keep the connection. The instrument and turntable are controlled by RanLOS BeamLab. Up to 2×2 MIMO measurements can be performed using a single RanLOS BeamForce 42.



RanLOS BeamForce 8

RanLOS BeamForce 8 is the ideal equipment for testing devices such as smaller base stations and terminals at higher frequencies. Sold stand-alone or together with a small test chamber.



Smart solution for testing smaller devices

Key features:

- Compact far field over-the-air (OTA) test system based on the Random Line-of-Sight technology
- High performance versus price
- Antenna and OTA performance measurements
- Comes with RanLOS BeamLab for fast and easy testing

The RanLOS BeamForce 8 test system consists of a cylindrical reflector fed by a dual polarized passive linear antenna array. The system provides two operational modes: Passive for antenna radiation pattern measurements and active for communication performance testing, for example throughput.

RanLOS also provides an advanced measurement software, RanLOS BeamLab, for controlling instruments and positioners. Visualization in 1D, 2D, 3D, and analysis of measurement data can conveniently be done directly in the software. Several instruments, turntables and other test equipment are compatible with the RanLOS BeamForce 8 which enables quick and easy handling of the total test setup.

In summary, RanLOS BeamForce 8 is a smart solution for testing smaller devices in an affordable way.

Specifications

RanLOS BeamForce 8

Frequency range [1]		27 GHz to 28.7 GHz
Polarization	Feed antenna	Dual polarized
RF connectors	Feed antenna	2 × 2.92 mm (female)
Impedance	Feed antenna	50 Ω
Quiet zone quality		
STD (cylindrical volume) [2]	Amplitude	< 1.2 dB
STD (cylindrical volume) [2]	Phase	< 10°
Peak-to-peak (parallel line) [3]	Amplitude	< 4 dB
Peak-to-peak (parallel line) [3]	Phase	< 40°
Dimensions	D x H x W	0.4 m x v m x 0.8 m
Weight		Approx. 20 kg

1. The frequency range can be expanded by exchanging the antenna array.
2. The standard deviation is calculated in a cylindrical test volume with d = 0.3 m, h = 0.2 m, and p = 0.3 m, see the figure on next page.
3. The peak-to-peak variation is calculated along a parallel line with width with d = 0.3 m at p = 0.3 m, see the figure on next page.

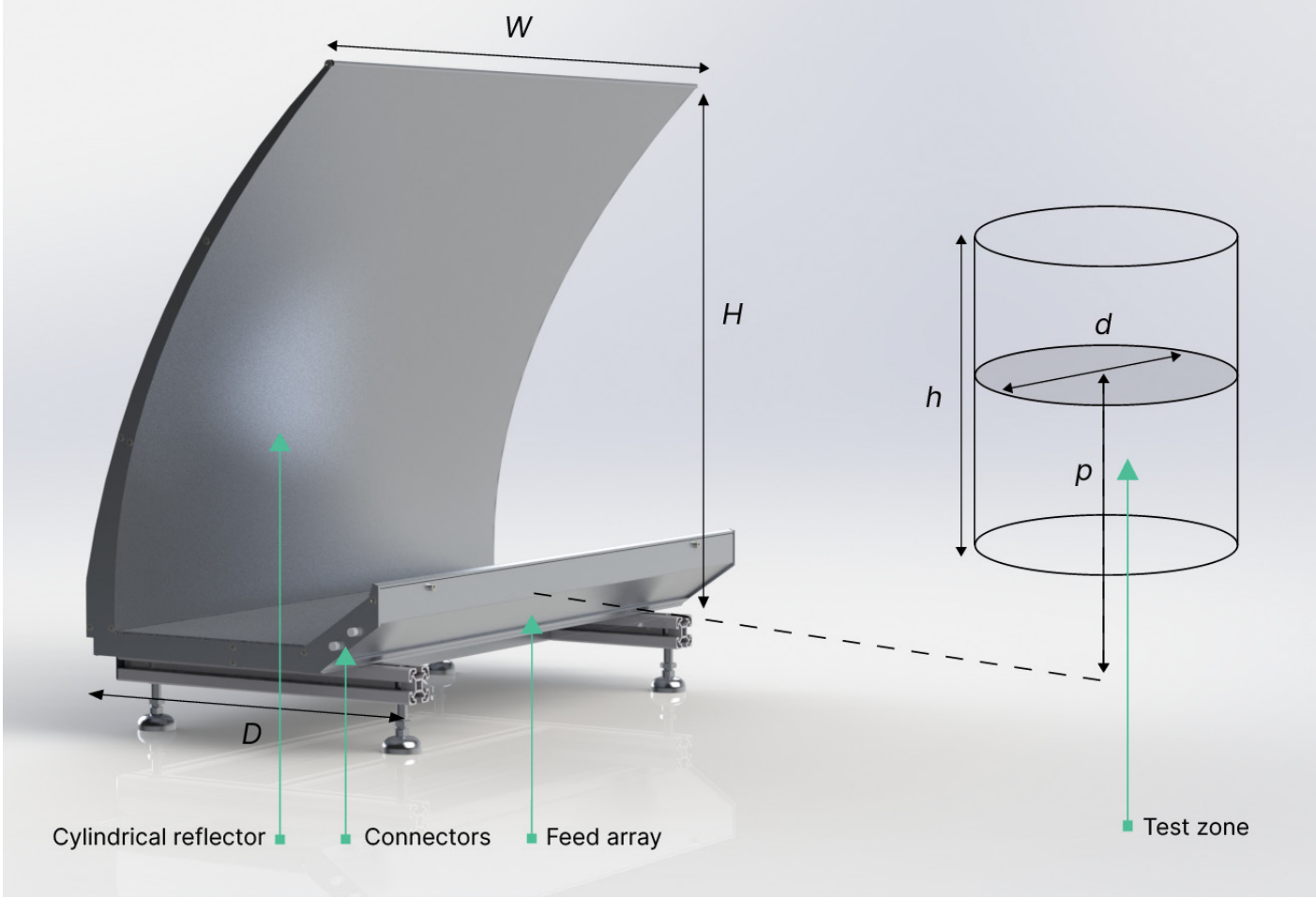
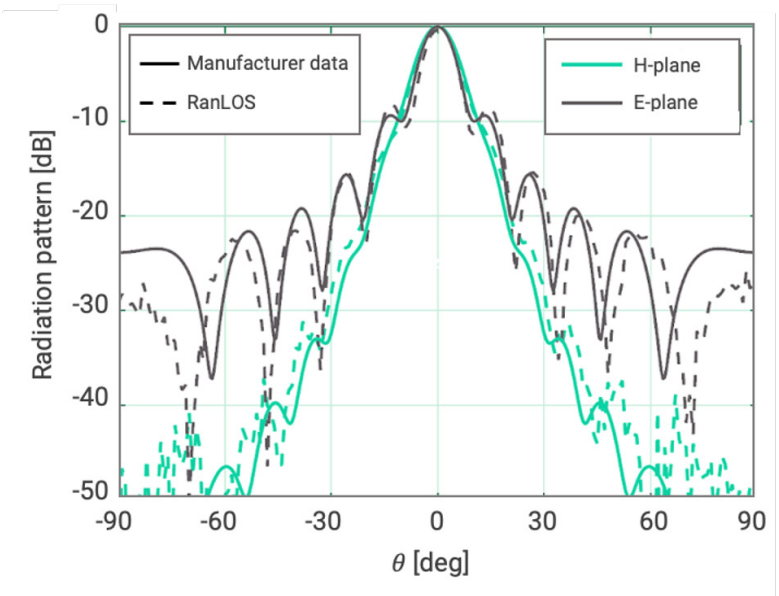


Figure related to specifications

Measurement comparison

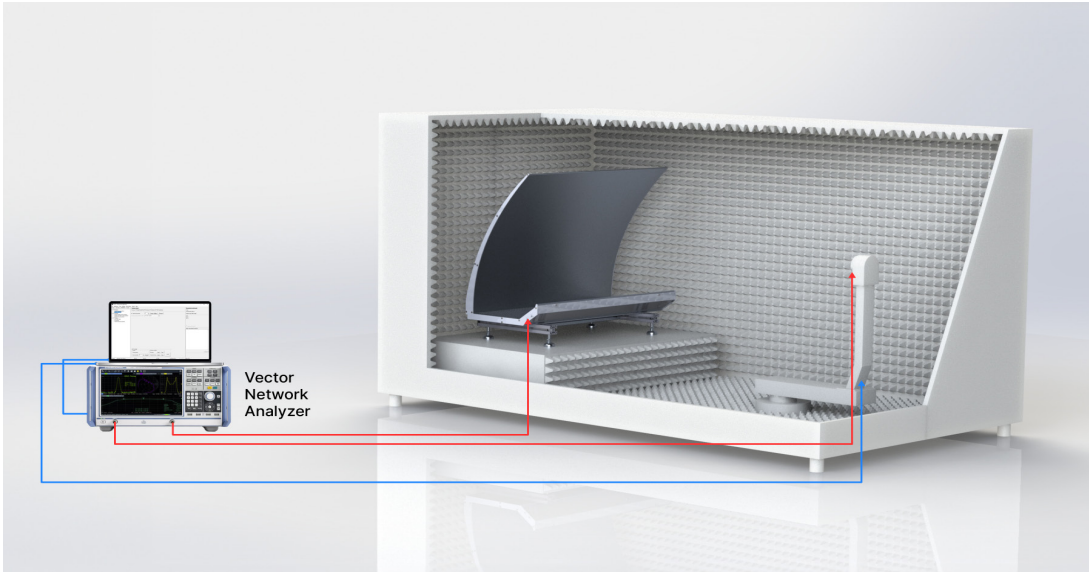
Measurements of a standard gain horn antenna. Comparison between measurements using the RanLOS BeamForce 8 and data from antenna manufacturer.



Measurement setup

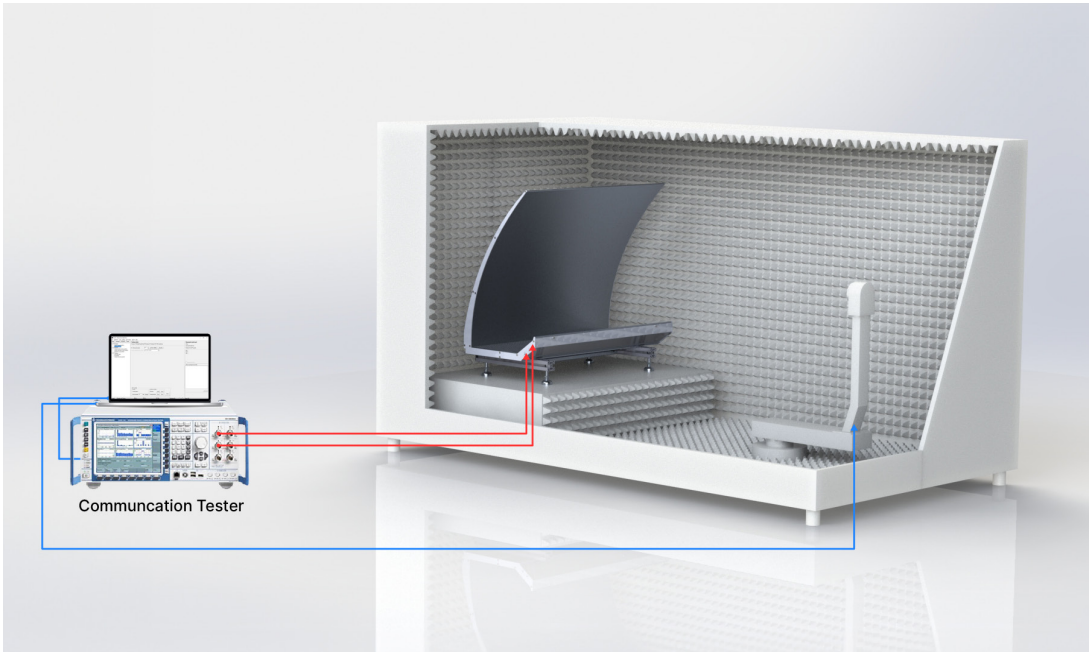
Antenna performance measurements

The setup for antenna performance measurements uses a Vector Network Analyzer to collect the data. The instrument and turntable are controlled by RanLOS BeamLab. It is possible to measure both polarizations simultaneously, by using a 4-port instrument.



OTA communications performance measurements

The setup for OTA measurements uses a communication tester that acts as the base station and feeds the dual polarized antenna array. The instrument and turntable are controlled by RanLOS BeamLab. Up to 2×2 MIMO measurements can be performed using a single RanLOS BeamForce 8.



Setups using the RanLOS BeamForce 8 test system

RanLOS BeamLab

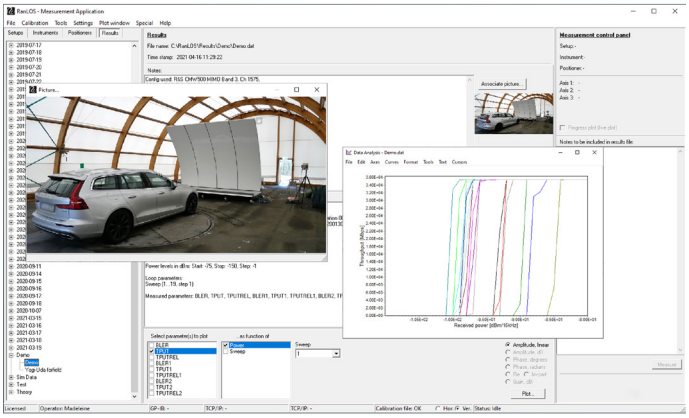
RanLOS BeamLab is the measurement software that controls instruments, positioners and collects measurement data. The collected data can be visualized and analyzed in many different ways directly in the software. You get full control over the entire test process and can perform a measurement in a few easy steps.

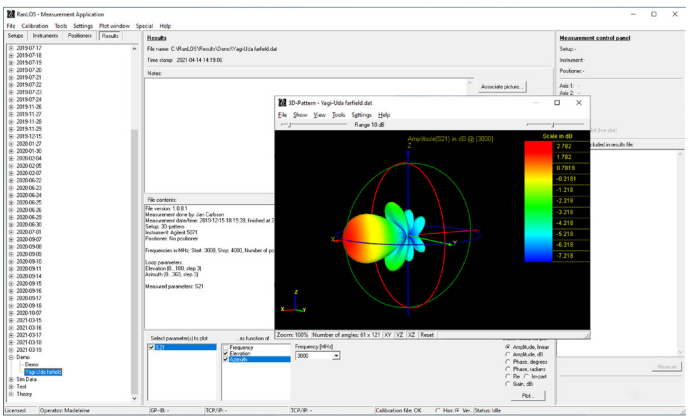


Perform a measurement in a few easy steps

Key features:

- Supports both antenna and OTA performance measurements
- Perform a measurement in a few steps - the software guides the user throughout the whole measurement process
- No specialist education needed
- Get results directly without post-processing
- Easy plotting in 1D, 2D, and 3D
- Quick and easy analysis of measurement data





The figure above shows the visualization of measurement data

A number of features are supported, and the operator is guided through the measurement process with easy-to-use instructions. The measurement results can be plotted and compared with previous measurements. Pictures of the setup can be included in the measurement result file.

RanLOS BeamLab is module-based, so drivers for additional instruments and positioners can be ordereded from RanLOS when the need occurs.



Supported instruments

Network Analyzers (VNA):

- HP/Agilent/Keysight E5071
- HP/Agilent/Keysight 8363
- HP/Agilent/Keysight 8722
- HP/Agilent/Keysight 8753
- Anritsu ShockLine series ME7868A
- Anritsu ShockLine series ME7869A
- Anritsu ShockLine series MS46121A
- Anritsu ShockLine series MS46121B
- Anritsu ShockLine series MS46122A
- Anritsu ShockLine series MS46122B
- Anritsu ShockLine series MS46322A
- Anritsu ShockLine series MS46322B
- Anritsu ShockLine series MS46522B
- Anritsu ShockLine series MS46524B
- Rohde & Schwarz ZNA 43
- Rohde & Schwarz ZNB 8
- Rohde & Schwarz ZNB 20
- Rohde & Schwarz ZNB 26
- Rohde & Schwarz ZNB 40

Communication testers

- Anritsu MT8000A
- Anritsu MT8820
- Anritsu MT8821
- Rohde & Schwarz CMW500

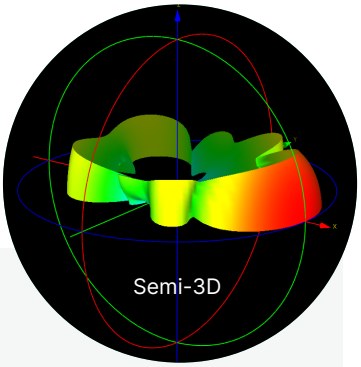
Supported positioners

- ASYSOL ASYCONT 300-8
- INNCO CO3000
- TOKIN 5905
- RanLOS BeamTilt

RanLOS BeamTilt

RanLOS BeamTilt is an advanced lift-and-tilt solution designed to complement the RanLOS BeamForce 42 test system, enhancing flexibility in testing antennas and wireless communication across different elevation angles.



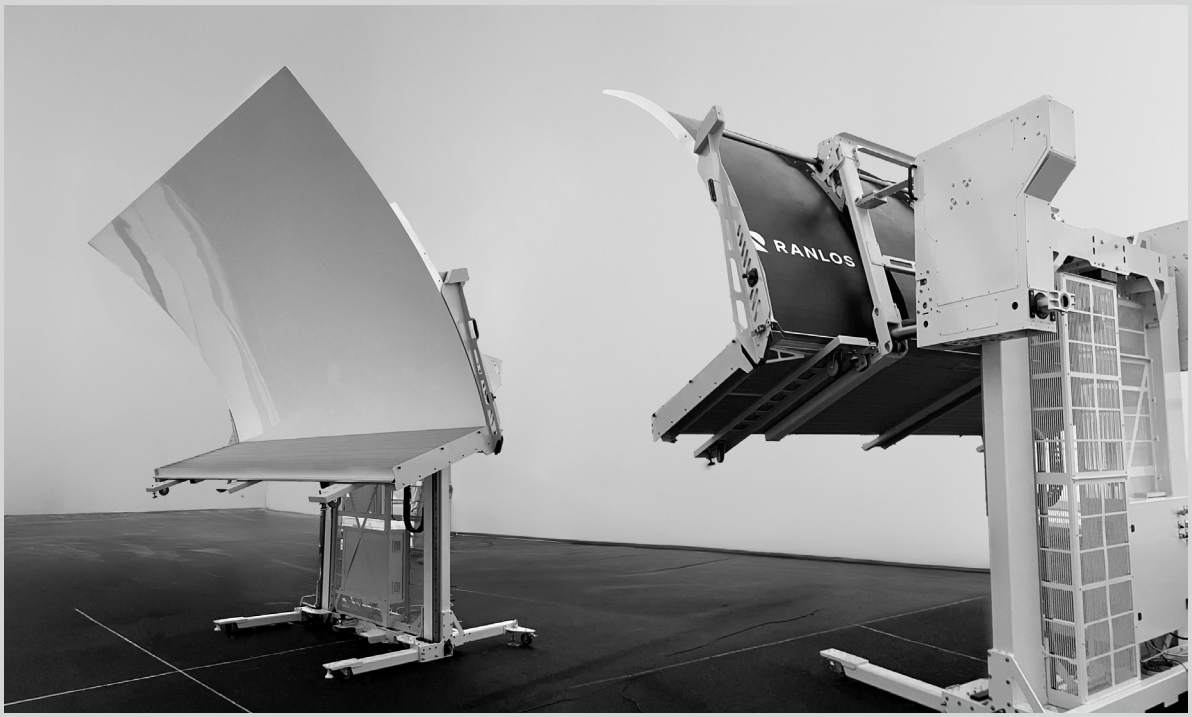


Key features:

- Controlled by BeamLab software via Ethernet interface
- Can be used stand-alone or in combination with turntable
- Enables measurements for elevation angles up to 20 deg.
- Together with a turntable enables semi-3D measurements
- Designed for ease of use, featuring wheels for easy repositioning and high measurement accuracy

RanLOS BeamTilt enables semi-3D measurement capabilities and was developed as part of a government-funded research project called SIVERT 2. It provides precise evaluations at different elevation angles, allowing for greater flexibility in testing antennas and wireless performance.

Combined with the BeamForce 42 test system, BeamTilt allows for more detailed and realistic testing scenarios, helping companies and industries optimize antenna designs for vehicles and other wireless connected systems.





RanLOS BeamTilt

We reserve the right for any inaccuracies.
The content in this publication is subject to change without prior notice.



About RanLOS:

RanLOS is a Swedish technology company that develops and provides cost-effective test solutions for antennas and wireless communication. The company's products are designed for applications in the automotive and defense industries, as well as for test laboratories and manufacturers of electronics and connected devices.

RanLOS technology enables efficient testing and verification of connected systems and wireless standards such as 4G, 5G, Wi-Fi and V2X. The solutions combine patented hardware with proprietary software and are designed to make advanced antenna and wireless performance testing more flexible, easy and cost-effective.

Founded in 2016, RanLOS originates from extensive research at Chalmers University of Technology in Gothenburg, Sweden. The company has international presence through partners and distributors and is listed on NGM Nordic SME.