mvg
Microwave Vision Group

STARLAB

The Scalable, Trusted Platform for What's Next in Antenna Testing

StarLab | HORIZON

StarLab is a compact near-field multi-probe antenna measurement system, designed for laboratories and production environments where space is limited. It enables precise characterization of antennas and wireless devices, covering both passive antenna measurements and over-the-air (OTA) testing. Its turn-key design combines portability with the accuracy of a laboratory-grade tool, delivering reliable results on key parameters such as gain, directivity, efficiency, radiation patterns, TRP, TIS, EIRP, and EIS.

Building on this foundation, StarLab is available in multiple configurations to address a wide range of testing requirements. From essential product validation to advanced research and defense-grade applications, each version offers the same trusted compactness, speed, and reliability while scaling to meet specific needs.

+ Covers testing needs from basic validation to defense-grade R&D
+ Offers modular software bundles tailored to your workflow
+ Supports flexible, scalable configurations to grow with your needs

Choose the right system for your requirements—and move faster with confidence.

+ Telecommunications

Enabling Seamless Connectivity

StarLab enables telecom developers to streamline antenna testing across the full wireless spectrum. From validating OTA module behavior in smartphones, AI-driven robotics, IoT devices, and BTS equipment to optimizing performance for FR3 and future 6G designs, the system simplifies complex troubleshooting tasks. Its wide frequency support allows engineers to address legacy protocols alongside emerging standards—ensuring compliance and accelerating innovation for both cloud-connected and edge-computed solutions.

Aerospace & Defense

Driving Innovation Superiority

StarLab provides aerospace and defense organizations with accurate and reliable antenna testing up to 50 GHz across diverse platforms — from UAVs to satellite terminals. Its compact and portable design makes it an ideal complement to large anechoic chambers, freeing their capacity by handling detailed investigations at the sub-module level or in space-constrained labs. Beyond hardware performance, StarLab offers open API and developer mode access, enabling users to implement and validate proprietary test protocols and adapt workflows to unique mission requirements. Combined with a powerful post-processing software suite, it delivers advanced diagnostic and optimization tools to refine performance, validate mission-critical systems, and accelerate innovation — maintaining technological superiority.

Academia & Research

Cost-effective Solutions for Education

For universities and research centers, StarLab provides an accessible, versatile platform for antenna studies. It covers a broad frequency range to support diverse research needs, while staying cost-effective for academic budgets. Whether for teaching fundamentals or enabling advanced investigations, StarLab empowers researchers and students alike with reliable, future-ready measurement capabilities.

Hardware specification

MAIN FEATURES

Technology

- Near-field/Spherical
- ☐ Near-field/Cylindrical

Measurement capabilities

- Gain
- Directivity
- Beamwidth
- Cross polar discrimination
- Sidelobe levels
- 3D radiation pattern
- Radiation pattern in any polarization (linear or circular)
- Antenna efficiency
- TRP, TIS, EIRP and EIS

SYSTEM CONFIGURATIONS

Equipment

- ■ Arch with probe array, AUT positioner
- ■ Control unit
- ■ Power and control unit
- ■ Tx and Rx amplification units
- ■ Instrumentation rack
- ■ Uninterruptible power supply
- ○ Vector network analyzer

Add-ons

- ☐ Shielded anechoic chamber (OTA testing)
- ☐ Linearpositioner for linear array antenna measurements (cylindrical mode)

OTA Equipment

- ☐ Radio communication tester
- ☐ Active switching unit
- ☐ Transfer switching unit

Max size of DUT

- 45 max diameter
- Up to 400 cm L x 45 cm W - for cylindrical set-up (only on Pro and Pro+)

Max. weight of DUT (centered load)

- 10 kg on polystyrene mast
- 50 kg on ultra-rigid mast
- 80 kg for cylindrical mode

Accessories

- ■ Reference horns
- ■ PC
- ■ Ultra-rigid mast
- ☐ Laptop support interface
- ☐ Hand and head phantom
- ☐ Reference antennas

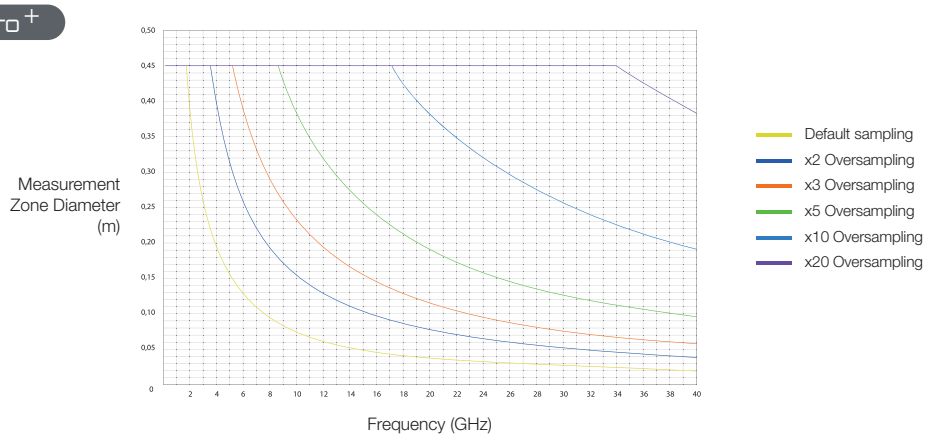
Services

- ■ Installation
- ■ Training
- ■ Warranty
- ☐ Post warranty service plans

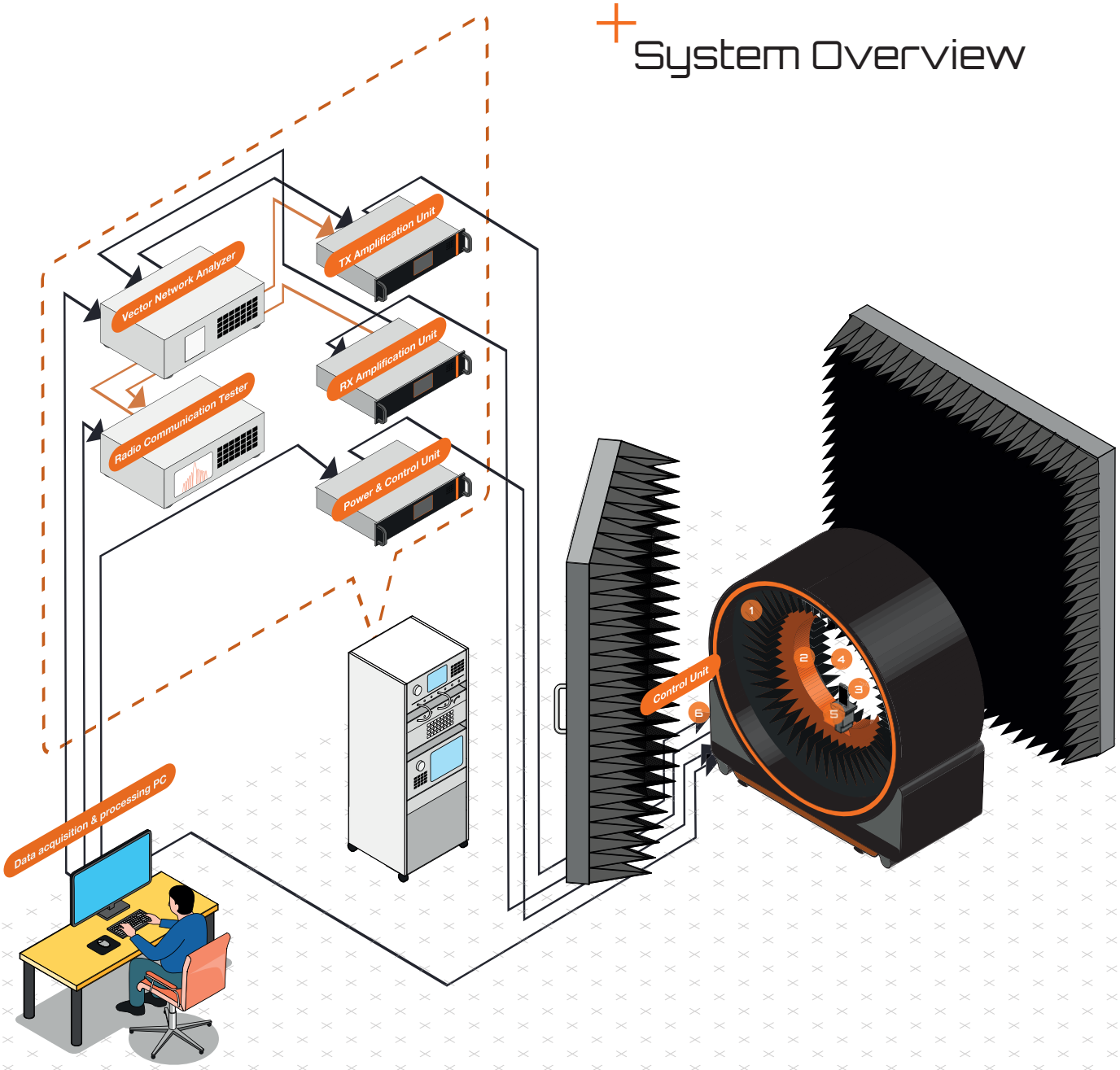
■ Included ☐ Optional ○ Required

Measurement Zone Capabilities | DUT size vs. frequency comparison

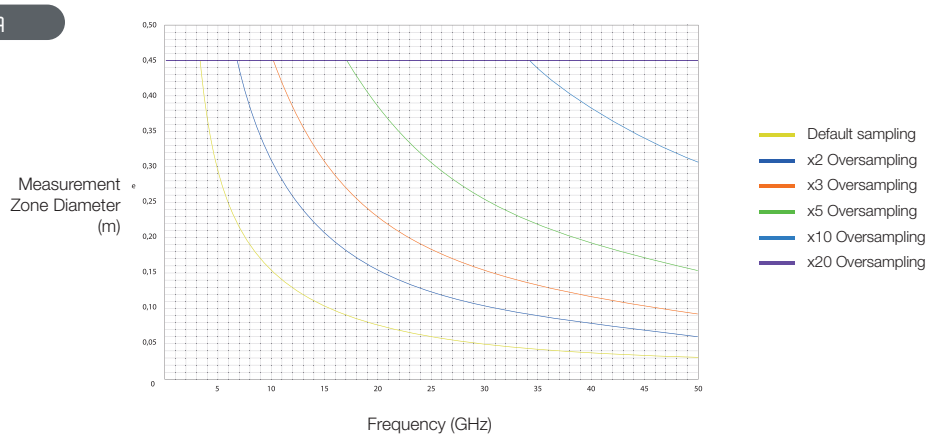
StarLab Core to Pro+

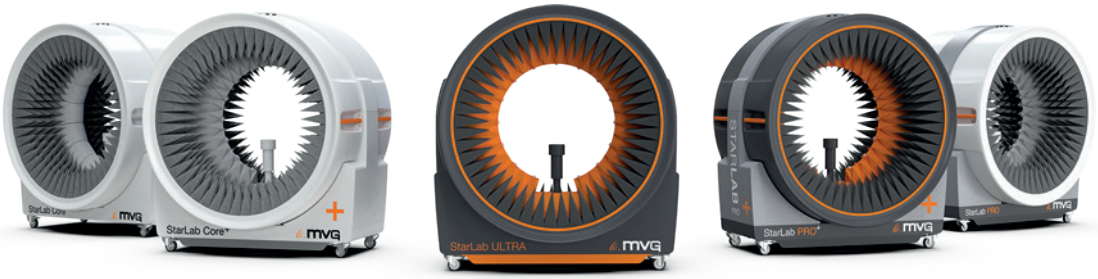


System Overview



StarLab ULTRA





FREQUENCY BAND

650 MHz - 50 GHz

18 GHz - 50 GHz

650 MHz - 40 GHz

650 MHz - 18 GHz

650 MHz - 10 GHz

650 MHz - 8 GHz

ESSENTIAL ANTENNA TESTING

StarLab Core

Antenna Performance Evaluation
Gain, efficicency testing

OTA
NR (LTE) OTA, WiFi OTA, Bluetooth-BLE testing, IoT (LTE based) OTA testing, TRP- EIRP, Spectrum measurement, Radiated power testing with spectrum analyzer (optional)

TYPICAL USE CASE

Telco

Academics

Aerospace and Defense

BASIC ANTENNA EVALUATION

- IoT device development and production testing
- Rapid prototyping and integration checks
- Connectivity modules (Wi-Fi, Bluetooth, GNSS, LTE)
- Fundamental antenna performance checks

6 products for multiple applications

COMPREHENSIVE ANTENNA TESTING

StarLab Core+

StarLab PRO

Antenna Performance Evaluation
Gain, efficicency testing
Axial ratio, beam-width, average gain
back-propagation, phase center and group delay

OTA
NR (LTE) OTA, WiFi OTA, Bluetooth-BLE testing, IoT (LTE based) OTA testing, GNSS OTA testing, TRP- EIRP, TIS- EIS

Dev mode - ONS
- Spectrum measurement, Radiated power testing with spectrum analyzer
- Sensitivity testing without radio comm tester
- Python scripting test, customizable test under OTA condition

COMPLETE ANTENNA OPTIMIZATION AND INSIGHTS

StarLab PRO+ CYL

StarLab ULTRA Wideband

StarLab ULTRA Passive

Antenna Performance Evaluation
Gain, efficicency testing
Axial ratio, beam-width, average gain
Back-propagation, phase center and group delay
Diagnosis and optimization with simulation (INSIGHT)

OTA
NR (LTE) OTA, WiFi OTA, Bluetooth-BLE testing, IoT (LTE based)
OTA testing, GNSS OTA testing, TRP- EIRP, TIS- EIS

Dev mode - ONS
- Spectrum measurement, Radiated power testing with spectrum analyzer
- Sensitivity testing without radio comm tester
- Python scripting test, customizable test under OTA condition

Dev mode - API
- Remote MVG hardware by user's script
- Remote Wavestudio from user's script

APPLICATIONS

ADVANCED ANTENNA EVALUATION

- Mobile device and module testing (smartphones, laptops, etc.)
- 5G FR1/FR3 and early 6G research up to 18 GHz
- Accelerated prototyping cycles (2× faster than Basic)
- Base station and small-cell antenna evaluation (+cylindrical option)
- Multi-technology OTA validation (LTE, 5G, Wi-Fi, Bluetooth, GNSS)

- Teaching and hands-on lab training in antenna fundamentals
- Rapid prototyping for research projects
- Academic studies on emerging wireless systems up to 18 GHz

- Antenna testing for satellite communications (ground and onboard)
- Verification of avionics and radar subsystems up to 18 GHz
- Cost-effective prototyping prior to large-chamber use
- Development of defense platforms (small UAVs, secure comms equipment) in controlled facilities

ANTENNA OPTIMIZATION AND DIAGNOSIS

- R&D for advanced 5G FR1/FR2/FR3 and early 6G up to 50 GHz
- In-depth troubleshooting with post-processing software
- Proprietary protocol validation and customization via developer mode

- Research into advanced 5G/6G and mmWave concepts up to 50 GHz
- Exploration of new standards and communication techniques
- Detailed investigations of novel antenna architectures
- Advanced analysis and optimization with post-processing tools

- Research labs for radar and aerospace communication systems
- Sub-module investigations, freeing capacity in large chambers
- Proprietary and in-house protocol validation via developer mode
- High-precision diagnostics and optimization with advanced post-processing software suite

Software Bundles

A modular suite designed to address the specific requirements of passive, OTA Mobile Cellular, IoT, and cylindrical testing.

PASSIVE MEASUREMENTS

Passive Essential

The essential package for passive antenna measurements. It includes basic data acquisition with WaveStudio Passive and fundamental computation with MV-Sphere Basic.

Passive Advanced

An enhanced version of Passive Core with expanded computation and analysis tools. It includes MV-Sphere Advanced for improved spherical Near-Field to Far-Field (NF-to-FF) transformation, plus advanced features:

+ **Computation tools:**
  - **MV-Holography** computes the field on a planar surface (planar back-propagation) from FF or SWC data
  - **MV-Iterative** extrapolates a spherical field measurement in the truncated region (area in which data is not measured) to estimate the field over the full spherical measurement grid.
  - **MV-Phase** determines the phase center of an antenna using 3D FF data
  - **MV-Translate & Rotate** allows the Spherical FF data to be translated and rotated within the coordinate system
+ **Analysis tool**
  - **Antenna Analyzer** is advanced analysis tool to extract most of antenna factors & radiation patterns from WaveStudio Far-field

OTA MEASUREMENTS

OTA Mobile Cellular Essential

The essential package for cellular testing, covering all legacy 2G-4G standards, including TDSCDMA, LTE Unlicensed and License Assisted Access LAA. It includes a legacy Radio Com Tester driver.

OTA Mobile Cellular Advanced

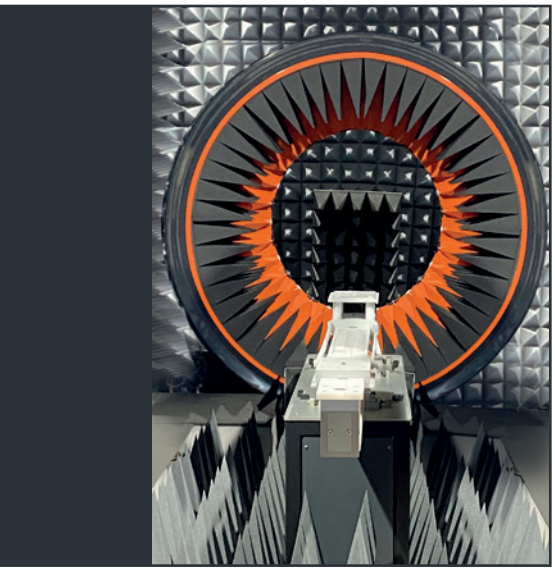
An advanced version of Mobile Cellular Essential with full 5G support. It adds NR Standalone (SA) and NR Non-Standalone (NSA) modes (LTE/NR anchored) and includes an advanced Radio Com Tester (single-box/one-box type) driver.

OTA IoT Essential

The essential package for IoT connectivity testing, covering all legacy WLAN and Bluetooth standards. It supports 802.11 a/b/g/n/ac/ax, Bluetooth, BLE (including test mode, advertising channels, and signaling), and includes a legacy Radio Com Tester driver.

OTA IoT Advanced

An extended version of IoT Core with additional capabilities. It introduces support for the latest WLAN 802.11 be standard, Standalone GNSS (GPS, etc.), and an advanced Radio Com Tester (single-box/one-box type) driver.



Cylindrical Mode

An add-on bundle that unlocks StarLab's cylindrical scanning capability, enabling passive antenna measurements and precise 3D characterization of long linear arrays—up to 4 meters in length.

By overcoming the 45 cm DUT size limitation of spherical mode, Cylindrical Mode transforms StarLab's compact circular design into a powerful asset for evaluating large, linear antennas. A dedicated rail setup supports the DUT during measurement, enabling smooth and accurate cylindrical scanning.

This expansion, available with StarLab Core+, Pro, and Pro+, enhances StarLab's versatility for advanced passive measurements — without compromising accuracy and with minimal impact on system footprint.

<DEVELOPER/> MODE

Developer-Mode give you full control over system operations with both OTA Non-signaling (ONS) and API integration. Enables custom scripting and automation for advanced test scenarios.

ONS (OTA Non-Signaling)

Direct hardware control for custom OTA test scenarios via Python scripting in WaveStudio. Enables automated measurements of uplink/downlink signa ls.

Software and Hardware API Remote Control

Supports external scripting for automation and custom application integration for the control over MVG systems (Arch API) and software (Remote WaveStudio API).

Hardware/Software Matrix

	StarLab Core	StarLab Core+
	Affordable OTA Testing Made Easy	All in One OTA and Passive Testing
	650 MHz - 8 GHz	650 MHz - 10 GHz
	Half arch of single probe array 8 low frequency probes	Full arch of single probe array 15 low frequency probes
PASSIVE		
Essential	✓	✓
Advanced	✗	○
CYLINDRICAL		
Cylindrical	✗	✓
OTA Mobile Cellular		650 MHz - 11 GHz (on OTA only)
Essential	✓	✓
Advanced	✗	✓
OTA IoT		
Essential	○	○
Advanced	✗	○
<Developer/> Mode		
Developer Mode gives full system control with OTA Non-signaling and API integration, enabling custom scripting and automation.		
API	✗	○
OTA NS DL	○	○
OTA ONS DL	✗	✗

StarLab PRO

Versatile platform for R&D

650 MHz - 18 GHz

Full arch of 29 interleaved probes
15 low frequency (650 MHz - 10 GHz)
14 high frequency (10 GHz - 18 GHz)

StarLab PRO+ CYL

Test Power without Compromise

650 MHz - 40 GHz

15 low frequency (650 MHz - 10 GHZ)
14 high frequency (10 GHz - 40 GHz)

StarLab ULTRA Wideband

The Ultimate Test System

650 MHz - 50 GHz

Full arch (half-half) of 29 probes
7 low frequency (650 MHz - 10 GHz)
& 7 high frequency (10 GHz-18 GHz)
15 UHF probes (18 GHz- 50 GHz)

StarLab ULTRA Passive

The Ultimate Test System for Defense

18 GHz - 50 GHz

Full arch of 29 probes
All 29 UHF probes (18 GHz - 50 GHz)
aligned on full arch

✓	✓	✓	✓
✓	✓	✓	✓
○	✓	✗	✗
○	○	✓	✗
○	○	✓	✗
○	○	○	✗
○	○	○	✗
✓	✓	✓	✓
✓	✓	✓	✓
○	○	○	○

✓ Included ○ Optional ✗ Unavailable

StarLab Core

650 MHz - 8 GHz

System Specification

Measurement Time (10 frequencies)	
AUT size 15 cm - 2.4 GHz	3 min
AUT size 15 cm - 7.2 GHz	10 min
AUT size 45 cm - 2.4 GHz	10 min
Typical dynamic range	50 - 60 dB

Radiation Pattern Accuracy

		10 dBi AUT	20 dBi AUT	30 dBi AUT
Peak gain accuracy	0.65 - 1 GHz	<± 2.0 dB	-	-
	1 - 8 GHz	<± 1.0 dB	<± 0.9 dB	-
-10 dB sidelobe accuracy	0.65 - 1 GHz	<± 2.1 dB	-	-
	1 - 8 GHz	<± 1.1 dB	<± 0.9 dB	-
-20 dB sidelobe accuracy	0.65 - 1 GHz	<± 5.0 dB	-	-
	1 - 8 GHz	<± 2.9 dB	<± 1.1 dB	-
-30 dB sidelobe accuracy	0.65 - 1 GHz	-	-	-
	1 - 8 GHz	-	<± 3.0 dB	-
Peak gain repeatability	<± 0.5 dB			
Probe network	0.65 - 8 GHz	8 probes (half-arch)		

Mechanical Characteristics

External dimensions of StarLab	1.9 x 1.1 x 2.0 m (L x W x H)
Probe array internal diameter	0.9 m
Optional anechoic chamber size	2.4 x 2.4 x 2.4 m
Angle between probes in the same frequency band	22.50°

DUT MAX. WEIGHT	
Polystyrene mast	10 kg
Ultra rigid mast	50 kg
Linear antenna	Not available

StarLab Core+

650 MHz - 10 GHz*

System Specification

Measurement Time (10 frequencies)	
AUT size 15 cm - 2.4 GHz	1 min
AUT size 15 cm - 11 GHz	8 min
AUT size 45 cm - 2.4 GHz	5 min
Typical dynamic range	60 - 70 dB

Radiation Pattern Accuracy

		10 dBi AUT	20 dBi AUT	30 dBi AUT
Peak gain accuracy	0.65 - 1 GHz	<± 1.5 dB	-	-
	1 - 10 GHz	<± 0.8 dB	<± 0.7 dB	-
-10 dB sidelobe accuracy	0.65 - 1 GHz	<± 1.6 dB	-	-
	1 - 10 GHz	<± 0.9 dB	<± 0.6 dB	-
-20 dB sidelobe accuracy	0.65 - 1 GHz	<± 4.5 dB	-	-
	1 - 10 GHz	<± 2.7 dB	<± 0.9 dB	-
-30 dB sidelobe accuracy	0.65 - 1 GHz	-	-	-
	1 - 10 GHz	-	<± 2.7 dB	-
Peak gain repeatability	<± 0.3 dB			
Probe network	0.65 - 10 GHz 15 probes			

Mechanical Characteristics

External dimensions of StarLab	1.9 x 1.1 x 2.0 m (L x W x H)
Probe array internal diameter	0.9 m
Optional anechoic chamber size	2.4 x 2.4 x 2.4 m
Angle between probes in the same frequency band	22.50°

DUT MAX. WEIGHT	
Polystyrene Mast	10 kg
Ultra rigid mast	50 kg

* Up to 11 GHz on OTA

StarLab PRO

650 MHz - 18 GHz

System Specification

Measurement Time (10 frequencies)	
AUT size 15 cm - 2.4 GHz	1 min
AUT size 15 cm - 18 GHz	18 min
AUT size 45 cm - 2.4 GHz	5 min
Typical dynamic range	60-70 dB

Radiation Pattern Accuracy

		10 dBi AUT	20 dBi AUT	30 dBi AUT
Peak gain accuracy	0.65 - 1 GHz	<± 1.5 dB	-	-
	1 - 18 GHz	<± 0.8 dB	<± 0.7 dB	<± 0.6 dB
-10 dB sidelobe accuracy	0.65 - 1 GHz	<± 1.6 dB	-	-
	1 - 18 GHz	<± 0.9 dB	<± 0.6 dB	<± 0.4 dB
-20 dB sidelobe accuracy	0.65 - 1 GHz	<± 4.5 dB	-	-
	1 - 18 GHz	<± 2.7 dB	<± 0.9 dB	<± 0.6 dB
-30 dB sidelobe accuracy	0.65 - 1 GHz	-	-	-
	1 - 18 GHz	-	<± 2.7 dB	<± 1.0 dB
Peak gain repeatability	<± 0.3 dB			
Probe network	0.65 - 10 GHz 15 Probes			
	10 - 18 GHz 14 Probes			

Mechanical Characteristics

External dimensions of StarLab	1.9 x 1.1 x 2.0 m (L x W x H)
Probe array internal diameter	0.9 m
Optional anechoic chamber size	2.4 x 2.4 x 2.4 m
Angle between probes in the same frequency band	22.50°

DUT MAX. WEIGHT		
Polystyrene mast	10 kg	
Ultra rigid mast	50 kg	

Linear Antenna Measurement Characteristics

Geometry	Cylindrical	
Standard rail length	6 m	9 m
Linear array antenna max. length	2.5 m	4 m
Linear array antenna max.weight	80 kg	

StarLab PRO+ CYL

650 MHz - 40 GHz

System Specification

Measurement Time (10 frequencies)	
AUT size 15 cm - 2.4 GHz	1 min
AUT size 15 cm - 40 GHz	45 min
AUT size 45 cm - 2.4 GHz	5 min
Typical dynamic range	60 - 70 dB

Radiation Pattern Accuracy

		10 dBi AUT	20 dBi AUT	30 dBi AUT
Peak gain accuracy	0.65 - 1 GHz	<± 1.5 dB	-	-
	1 - 10 GHz	<± 0.8 dB	<± 0.7 dB	-
	10 - 40 GHz	<± 0.9 dB	<± 0.7 dB	<± 0.6 dB
-10 dB sidelobe accuracy	0.65 - 1 GHz	<± 1.6 dB	-	-
	1 - 10 GHz	<± 0.9 dB	-	-
	10 - 40 GHz	<± 1.0 dB	<± 0.6 dB	<± 0.4 dB
-20 dB sidelobe accuracy	0.65 - 1 GHz	<± 4.5 dB	-	-
	1 - 10 GHz	<± 2.7 dB	<± 0.9 dB	-
	10 - 40 GHz	<± 3.2 dB	<± 1.0 dB	<± 0.6 dB
-30 dB sidelobe accuracy	0.65 - 1 GHz	-	-	-
	1 - 10 GHz	-	<± 2.7 dB	-
	10 - 40 GHz	-	<± 3.2 dB	<± 1.0 dB
Peak gain repeatability	<± 0.3 dB			
Probe network	0.65 - 10 GHz 14 Probes			
	10 - 40 GHz 15 Probes			

Mechanical Characteristics

External dimensions of StarLab	1.9 x 1.1 x 2.0 m (L x W x H)
Probe array internal diameter	0.9 m
Optional anechoic chamber size	2.4 x 2.4 x 2.4 m
Angle between probes in the same frequency band	22.50°

DUT MAX. WEIGHT	
Polystyrene mast	10 kg
Ultra rigid mast	50 kg

Linear Antenna Measurement Characteristics

Geometry	Cylindrical	
Standard rail length	6 m	9 m
Linear array antenna max. length	2.5 m	4 m
Linear array antenna max.weight	80 kg	

StarLab ULTRA Wideband

650 MHz - 50 GHz

System Specification

Measurement Time (10 frequencies)*	
AUT size 15 cm - 2.4 GHz	1.5 min
AUT size 15 cm - 50 GHz	1.5 h
AUT size 45 cm - 2.4 GHz	8 min
Typical dynamic range	50 - 70 dB

Radiation Pattern Accuracy

		10 dBi AUT	20 dBi AUT	30 dBi AUT
Peak gain accuracy	0.65 - 1 GHz	<± 1.5 dB	-	-
	1 - 18 GHz	<± 0.9 dB	<± 0.7 dB	-
	18 - 50 GHz	<± 0.9 dB	<± 0.7 dB	<± 0.6 dB
-10 dB sidelobe accuracy	0.65 - 1 GHz	<± 1.6 dB	-	-
	1 - 18 GHz	<± 0.9 dB	<± 0.6 dB	-
	18 - 50 GHz	<± 0.9 dB	<± 0.6 dB	<± 0.4 dB
-20 dB sidelobe accuracy	0.65 - 1 GHz	<± 4.5 dB	-	-
	1 - 18 GHz	<± 2.7 dB	<± 0.9 dB	-
	18 - 50 GHz	<± 2.9 dB	<± 1.0 dB	<± 0.6 dB
-30 dB sidelobe accuracy	0.65 - 1 GHz	-	-	-
	1 - 18 GHz	-	<± 3.2 dB	<± 1.0 dB
	18 - 50 GHz	-	<± 2.9 dB	<± 1.0 dB
Peak gain repeatability	<± 0.3 dB			
Probe network	0.65 - 11 GHz 7 probes			
	11 - 18 GHz 7 probes			
	18 - 50 GH 15 probes			

Mechanical Characteristics

External dimensions of StarLab	1.9 x 1.1 x 2.0 m (L x W x H)
Probe array internal diameter	0.9 m
Optional anechoic chamber size	2.4 x 2.4 x 2.4 m
Angle between probes in the same frequency band	22.50°

DUT MAX. WEIGHT	
Polystyrene mast	10 kg
Ultra rigid mast	50 kg

*Measurement time can vary by VNA model & IFBW setup

StarLab ULTRA Passive Special

18 GHz - 50 GHz

System Specification

Measurement Time (10 frequencies)*	
AUT size 15 cm -18 GHz	4 min
AUT size 15 cm - 50 GHz	1.5 h
AUT size 45 cm - 18 GHz	40 min
Typical dynamic range	50 dB

Radiation Pattern Accuracy

			10 dBi AUT	20 dBi AUT	30 dBi AUT
Peak gain accuracy	18 - 50 GHz		<± 0.9 dB	<± 0.7 dB	<± 0.6 dB
-10 dB sidelobe accuracy	18 - 50 GHz		<± 0.9 dB	<± 0.6 dB	<± 0.4 dB
-20 dB sidelobe accuracy	18 - 50 GHz		<± 2.9 dB	<± 1.0 dB	<± 0.6 dB
-30 dB sidelobe accuracy	18 - 50 GHz		-	<± 2.9 dB	<± 1.0 dB
Peak gain repeatability	<± 0.3 dB				
Probe network	18 - 50 GHz	29 probes			

Mechanical Characteristics

External dimensions of StarLab	1.9 x 1.1 x 2.0 m (L x W x H)
Probe array internal diameter	0.9 m
Optional anechoic chamber size	2.4 x 2.4 x 2.4 m
Angle between probes in the same frequency band	11.25°

DUT MAX. WEIGHT	
Polystyrene mast	10 kg
Ultra rigid mast	50 kg

*Measurement time can vary by VNA model & IFBW setup

NOTES

Testing Connectivity for a Wireless World

The Microwave Vision Group offers cutting-edge technologies for the visualization of electromagnetic waves. With advanced test solutions for antenna characterization, radar signature evaluation and electromagnetic measurements, we support company R&D teams in their drive to innovate and boost product development.

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