StarLab 50 GHz

A Turnkey Measurement System for 5G Test Applications

LITTLE BIG LAB

Little in size, BIG in performance

StarLab 50 GHz

Future-proofed!

Made to meet the millimeter wave, high frequency testing challenge.

The MVG StarLab 50 GHz offers a wide range of frequency measurements, from 650 MHz to 50 GHz with flexibility in its design to accommodate different types of test configurations. The spherical or cylindrical near-field measurement capabilities of StarLab 50 GHz also provide flexibility in types of antennas to be tested, as stand-alone, arrays, or integrated in a system, and from low to high directivity. Its patented multi-probe electronic scanning and unlimited sampling technology built into the arch reduce mechanical movement of the DUT for unparalleled speed and accuracy of measurements.

Advancements in technology enabling more broadband, high capacity, high data rate transmissions have led to the increased necessity for accurate and precise OTA measurements in R&D labs and on production lines. In conjunction with MVG's WaveStudio software suite, an anechoic chamber and requisite instrumentation, StarLab 50 GHz is compliant with the standards specified for CTIA certification of wireless devices.

Built for efficiency, the StarLab 50 GHz is an all-in-one, turnkey solution and its compact and portable design facilitates flexibility in any test lab or production site location and space. Altogether, this advanced technology brings crucial speed and accuracy to the test and validation process of your future 5G device.

"MVG's ambition is to be at the leading edge of what the market needs in terms of 5G testing. By offering flexible test solutions that can be upgraded to serve future needs, we enable our customers to be competitive in the development of new products. Optimization of the test systems to find the best balance between total flexibility of a fully modular system and the efficiency of a single box solution, is a core competency of MVG. This know-how has been proven over many years through the delivery of first class test systems to the most competitive companies in the world."

MVG CEO, Philippe Garreau

A near-field multi-probe turn-key antenna measurement system for both passive antenna measurements and/or OTA testing, the StarLab 50 GHz integrates cutting-edge technology for the measurement and analysis of mm-wave frequencies. It provides fast and accurate test results for a variety of 5G devices, and its compact and portable design facilitates flexibility in test lab or production site location and space.

- **Ultra-fast test process – results in minutes**
- **High measurement accuracy**
- **Flexibility – space, location, antenna type**

SOLUTION FOR

- **mmWave antenna measurement**
- **mmWave OTA testing**
- **Linear array antenna measurements**

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

Frequency bands

- 650 MHz - 50 GHz
- 10 GHz - 50 GHz
- 18 GHz - 50 GHz

Max. Size of DUT

- 45 cm max diameter
- 270 cm L x 45 cm W - for cylindrical set-up

Max. weight of DUT (centered load)

- 10 kg on polystyrene mast
- 50 kg on ultra-rigid mast

Typical dynamic range

- 50 dB

Oversampling

- Arch rotation*

SYSTEM CONFIGURATIONS

Software

Measurement control, data acquisition and post processing
■ WaveStudio

Near-field/far-field transform
■ MV-Sphere

OTA measurement suite
□ WaveStudio

Advanced post processing
□ Antenna Analyzer
□ Insight

Equipment

■ Arch with probe array, AUT positioner, rubberized absorbers
■ 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)
○ Linear positioner for linear array antenna measurements (cylindrical testing)

OTA Equipment
□ Radio communication tester**
□ Active switching unit
□ Transfer switching unit

Accessories

■ Reference horns
■ PC
■ Ultra-rigid mast
□ Laptop support interface
□ Hand and head phantoms
□ Reference antennas

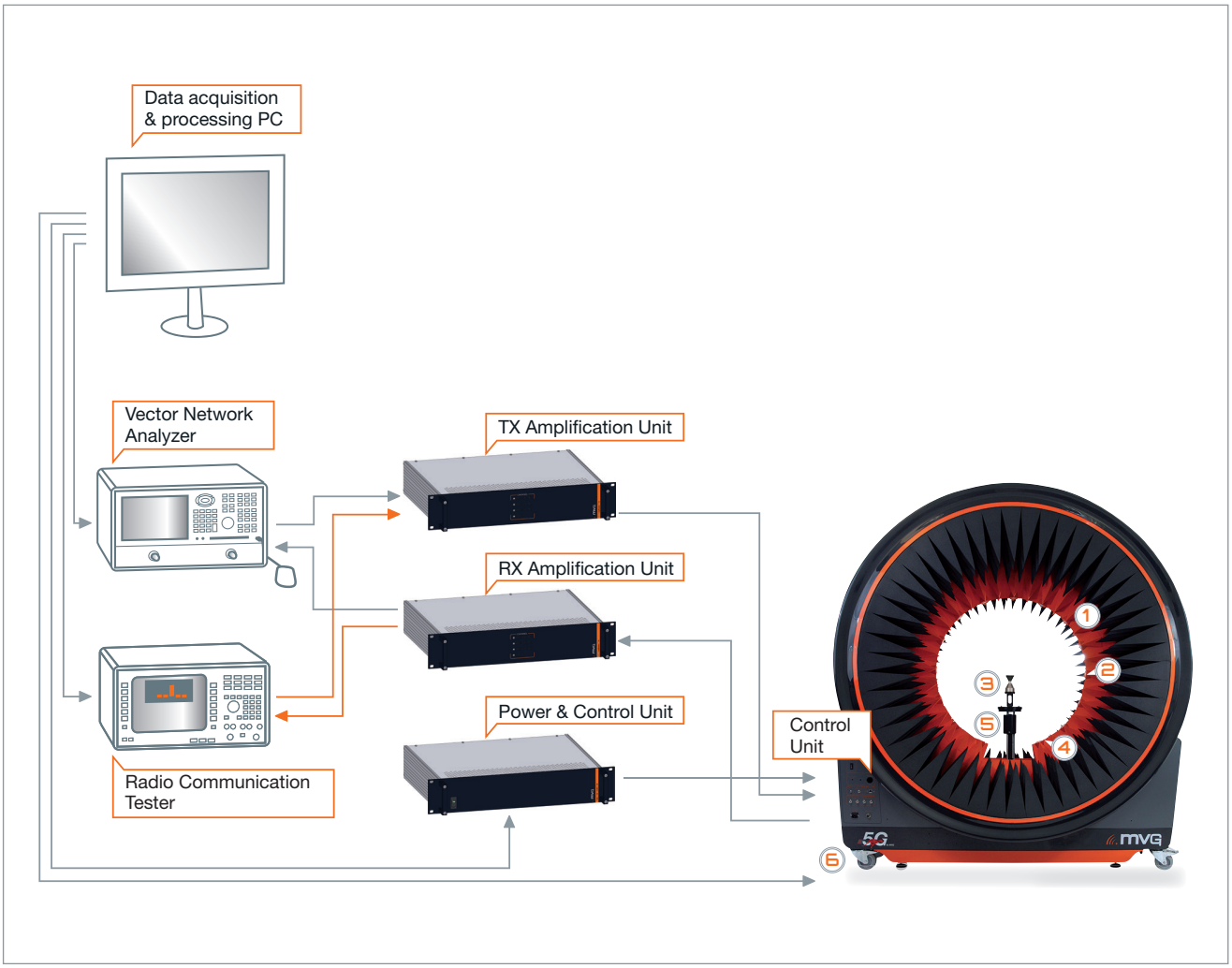
Services

■ Installation
■ Training
■ Warranty
□ Post warranty service plans

* Up to 11.25° depending on spacing between probes on each model's array / ** Primed for 5G

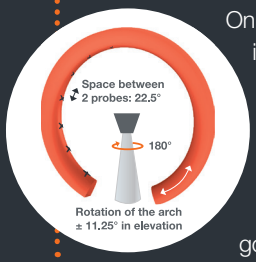
■ Included □ Optional ○ Required

System Overview



The StarLab 50 GHz is an all-in-one, turnkey test system solution which comprises the probe array unit as well as the necessary controllers, RF units, and software. The SL control unit drives the two positioning motors of the device and the electronic scanning of the probe array. The subsystem power and control unit supplies the power and drives the RF units. The amplification units convert low power to high power radio frequency signals via the transmission and reception channels.
For near-field passive measurements, a Vector Network Analyzer is to be used as the RF source/ receiver. For Over-the-Air (OTA) measurements, a Radio Communications Tester, primed for current OTA test standards, is necessary as an additional unit.

Unlimited sampling with StarLab 50 GHz

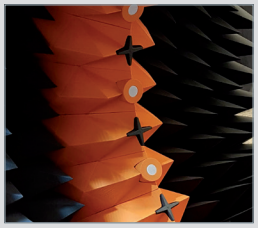


On a StarLab system, sampling is performed by a mechanical rotation of the arch in elevation. This unlimited sampling technology is integrated in the mechanical architecture of the system itself (no need for an extra goniometer).

Cylindrical measurement - Linear positioner

With a linear positioner, StarLab is converted from a spherical to a cylindrical near-field measurement system, particularly suitable for linear array antennas such as BTS or radar antennas. In addition to its standard capabilities, this configuration allows measurements of the beam tilt. StarLab in cylindrical mode can measure sidelobes up to 70° (typical) from boresight.

Standard System Components



1 Wedge Absorbers

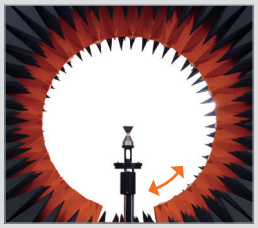
- Optimized design to minimize reflections

2 Cutting-edge Probes

- Up to 3 different types of probes to cover frequency bands from 650 MHz - 50 GHz
- Low directional, dual-polarized

3 High Accuracy Reference Antennas

- For reference measurements



4 High Precision Unlimited Sampling

- The mechanical rotation of the arch in elevation allows for unlimited sampling of the DUT

5 Sturdy, Transparent Positioner

- Rigid microwave transparent mast or high precision metallic mast

6 Accurate Stabilizers

- Fine level adjustment
- Accurate positioning in its test environment

System specifications*

MEASUREMENT TIME[1]	SL-5015-1807-0607[2]	SL-5015	SL- 5029
10 frequencies, 22.5° sampling	~ 0.5 min	~ 0.5 min	~ 0.5 min
10 frequencies, 4.5° sampling	~ 6 min	~ 6 min	~ 4 min
10 frequencies, 2.25° sampling	~ 19 min	~ 19 min	~ 12 min
Typical dynamic range	50 dB	50 dB	50 dB
	10 dBi AUT	**20 dBi AUT**	**30 dBi AUT**
PEAK GAIN ACCURACY			
0.65 GHz - 0.8 GHz	± 1.5 dB	-	-
0.8 GHz - 1 GHz	± 1.1 dB	-	-
1 GHz - 6 GHz	± 0.8 dB	± 0.7 dB	-
6 GHz - 18 GHz	± 0.9 dB	± 0.7 dB	± 0.6 dB
18 - 45 GHz	± 0.9 dB	± 0.7 dB	± 0.6 dB
45 - 50 GHz	± 0.9 dB	± 0.7 dB	± 0.6 dB
Peak gain repeatability	± 0.3 dB	± 0.3 dB	± 0.3 dB
- 10 dB SIDELOBE ACCURACY			
0.65 GHz - 0.8 GHz	± 1.6 dB	-	-
0.8 GHz - 1 GHz	± 1.1 dB	-	-
1 GHz - 6 GHz	± 0.9 dB	± 0.6 dB	-
6 GHz - 16 GHz	± 0.8 dB	± 0.5 dB	± 0.4 dB
16 GHz - 18 GHz	± 1.0 dB	± 0.6 dB	± 0.4 dB
18 - 45 GHz	± 0.8 dB	± 0.5 dB	± 0.4 dB
45 - 50 GHz	± 1.0 dB	± 0.6 dB	± 0.4 dB
- 20 dB SIDELOBE ACCURACY			
0.65 GHz - 0.8 GHz	± 4.5 dB	-	-
0.8 GHz - 1 GHz	± 3.5 dB	-	-
1 GHz - 6 GHz	± 2.7 dB	± 0.9 dB	-
6 GHz - 16 GHz	± 2.4 dB	± 0.8 dB	± 0.5 dB
16 GHz - 18 GHz	± 3.2 dB	± 1.0 dB	± 0.6 dB
6 GHz - 18 GHz	-	-	-
18 - 45 GHz	± 2.4 dB	± 0.8 dB	± 0.5 dB
45 - 50 GHz	± 2.9 dB	± 1.0 dB	± 0.6 dB
- 30 dB SIDELOBE ACCURACY			
0.65 GHz - 0.8 GHz	-	-	-
0.8 GHz - 1 GHz	-	-	-
1 GHz - 6 GHz	-	± 2.7 dB	-
6 GHz - 16 GHz	-	± 2.4 dB	± 0.8 dB
16 GHz - 18 GHz	-	± 3.2 dB	± 1.0 dB
18 - 45 GHz	-	± 2.4 dB	± 0.8 dB
45 - 50 GHz	-	± 2.9 dB	± 1.0 dB

* Specifications given according to the following assumptions:
  - Near-field measurement in spherical geometry
  - Controlled temperature and humidity during measurement
  - Specifications on radiation pattern are given for a normalized pattern
  - Measurements inside an anechoic chamber or equivalent conditions
  - Usage of an R&S PNA 5225B with 1kHz IF BW
  - Peak gain is given for a ± 0.3 dB of gain error on the reference antenna
  - DUT phase center does not exceed 8 cm from arch center
  - Measurement performed with a suitable mast, depending on the load and directivity of the DUT

[1] Typical time

[2] Pertains to measurement time of 50 GHz probe array. For the 0.65-18 GHz probe array times, contact us.

RF equipment characteristics

	SL- 5015-1807-0607	SL-5015	SL-5029	SL-5015-1814	SL-5015-0614	SL-5015-1014
FREQUENCY RANGE			**NUMBER OF PROBES**			
650 MHz - 6 GHz	7	-	-	-	14	-
650 MHz - 10 GHz	-	-	-	-	-	14
6 GHz - 18 GHz	7	-	-	14	-	-
10 GHz - 50 GHz	-	-	-	-	-	15
18 GHz - 50 GHz	15	15	29	15	15	-
Ref channel	2	1	1	2	2	2

Mechanical characteristics

External dimensions of StarLab	1.82 x 1.08 x 2.00 m (L x W x H)
Probe array internal diameter	0.9 m
Optional anechoic chamber size	1.92 x 2.97 x 2.08 m
Angle between probes in the same frequency band	SL 5015-1807-0607 22.50° SL 50-29 11.25°
DUT MAX. WEIGHT*	
Styrofoam mast	10 kg
Ultra rigid mast	50 kg

* Centered load

Maximum diameter of the DUT (m) SL-29

FREQUENCY (GHz)	NUMBER OF OVERSAMPLING x 1	x 2	x 5	x 10	x 15
18	0.08	0.17	0.42	0.45	0.45
20	0.08	0.15	0.38	0.45	0.45
22	0.07	0.14	0.35	0.45	0.45
24	0.06	0.13	0.32	0.45	0.45
26	0.06	0.12	0.29	0.45	0.45
28	0.05	0.11	0.27	0.45	0.45
30	0.05	0.10	0.25	0.45	0.45
32	0.05	0.10	0.24	0.45	0.45
34	0.04	0.09	0.22	0.45	0.45
36	0.04	0.08	0.21	0.42	0.45
38	0.04	0.08	0.20	0.40	0.45
40	0.04	0.08	0.19	0.38	0.45
42	0.04	0.07	0.18	0.36	0.45
44	0.03	0.07	0.17	0.35	0.45
46	0.03	0.07	0.17	0.33	0.45
48	0.03	0.06	0.16	0.32	0.45
50	0.03	0.06	0.15	0.31	0.45

Linear antenna measurement characteristics

Geometry	Cylindrical
Standard rail length	6 or 9 meters
Linear antenna max. weight	80 kg

Maximum diameter of the DUT (m) SL-5015-1807-0607

FREQUENCY (GHz)	NUMBER OF OVERSAMPLING x 1	x 5	x 10	x 20	x 30
0.65	0.45	0.45	0.45	0.45	0.45
1	0.45	0.45	0.45	0.45	0.45
2	0.38	0.45	0.45	0.45	0.45
3	0.25	0.45	0.45	0.45	0.45
4	0.19	0.45	0.45	0.45	0.45
5	0.15	0.45	0.45	0.45	0.45
6	0.13	0.45	0.45	0.45	0.45
7	0.11	0.45	0.45	0.45	0.45
8	0.10	0.45	0.45	0.45	0.45
9	0.08	0.42	0.45	0.45	0.45
10	0.08	0.38	0.45	0.45	0.45
11	0.07	0.35	0.45	0.45	0.45
12	0.06	0.32	0.45	0.45	0.45
13	0.06	0.29	0.45	0.45	0.45
14	0.05	0.27	0.45	0.45	0.45
15	0.05	0.25	0.45	0.45	0.45
16	0.05	0.24	0.45	0.45	0.45
18	0.04	0.21	0.42	0.45	0.45
20	0.04	0.19	0.38	0.45	0.45
22	0.03	0.17	0.35	0.45	0.45
24	0.03	0.16	0.32	0.45	0.45
26	0.03	0.15	0.29	0.45	0.45
28	0.03	0.14	0.27	0.45	0.45
30	0.03	0.13	0.25	0.45	0.45
32	0.02	0.12	0.24	0.45	0.45
34	0.02	0.11	0.22	0.45	0.45
36	0.02	0.11	0.21	0.42	0.45
38	0.02	0.10	0.20	0.40	0.45
40	0.02	0.10	0.19	0.38	0.45
42	0.02	0.09	0.18	0.36	0.45
44	0.02	0.09	0.17	0.35	0.45
46	0.02	0.08	0.17	0.33	0.45
48	0.02	0.08	0.16	0.32	0.45
50	0.02	0.08	0.15	0.31	0.45

OTA Performance Testing

StarLab can perform both TRP and TIS measurements. For TIS measurements, or where external interference is a concern, it is recommended to install the StarLab 50 GHz in a small shielded chamber.

OTA performance measurement specifications*

ACCORDING TO CTIA SPECIFICATIONS	
TRP accuracy free space	<± 1.9 dB
TRP accuracy talk position	<± 2.0 dB
TRP repeatability	± 0.3 dB
Typical TRP measurement time**	< 2 min
TIS accuracy free space	<± 2.0 dB
TIS accuracy talk position	<± 2.1 dB
TIS repeatability	± 0.5 dB
Typical TIS measurement time***	15 min > 60 min

CTIA comparable GSM/WCDMA protocols

TIS based on Rx Level accuracy	<± 2.8 dB
TIS based on Rx Level repeatability	<± 1.5 dB
Typical TIS based on Rx level measurement time***	< 6 min

CDMA2000 protocol

TIS optimized accuracy	<± 2.0 dB
TIS optimized repeatability	<± 0.5 dB
Typical TIS optimized measurement time***	< 11 min

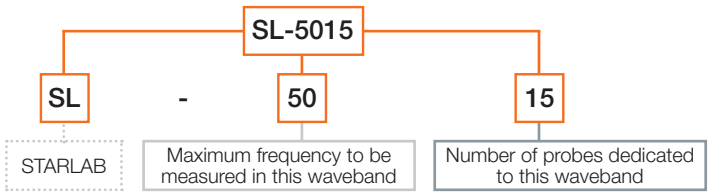
* Specifications given according to the following assumptions:
- Controlled temperature and humidity during measurement
- Measurements inside an anechoic chamber
- DUT phase center does not exceed 15 cm from arch center
- Calibration done with dipole gain reference values
- Measurement performed with a suitable mast depending on the load and directivity of the DUT

Specifications also depend on Radio Communication Tester and Protocol

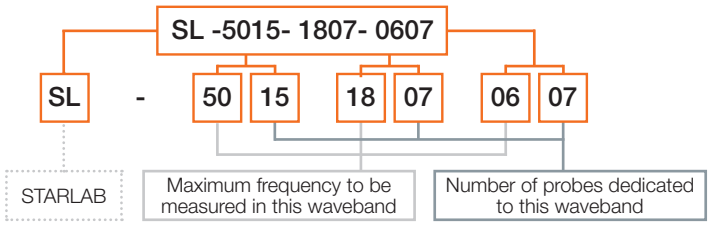
** One channel, 15° sampling, one time each probe, measurement time depends on protocol

*** One channel, 30° sampling, one time each probe, measurement time depends on protocol

StarLab 50 GHz model indexing explained



This model allows you to measure frequencies from 18 to 50 GHz, using 15 probes +1 reference channel.



This model allows you to make measurements in 3 frequency bands: from 650 MHz to 6 GHz using 7 probes + 1 reference channel, frequency bands from 6 GHz to 18 GHz using 7 probes + 1 reference channel, and frequency bands from 18 GHz to 50 GHz using 15 probes +1 reference channel.

Did you know?

The advanced technology in the StarLab 50 GHz brings flexibility to its configuration. For example, you can have your StarLab configured with 15 probes or 29 probes, for a selection of frequency bands to measure, from 650 MHz to 50 GHz, and for OTA measurements. When you invest in a StarLab 50 GHz, this flexibility also lends itself to the lab efficiency/expense tradeoff. With its wide frequency range measurement capacity, it can be configured to measure the bandwidths that best fit your needs and requirements.

MVG - 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.

WORLDWIDE GROUP, LOCAL SUPPORT

Our teams, in offices around the world, guide and support you from purchase, through design, to delivery and installation. Because we are local, we can assure speed and attention in project follow through. This includes customer support and maintenance once the system is in place. For the exact addresses and up-to-date contact information:
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