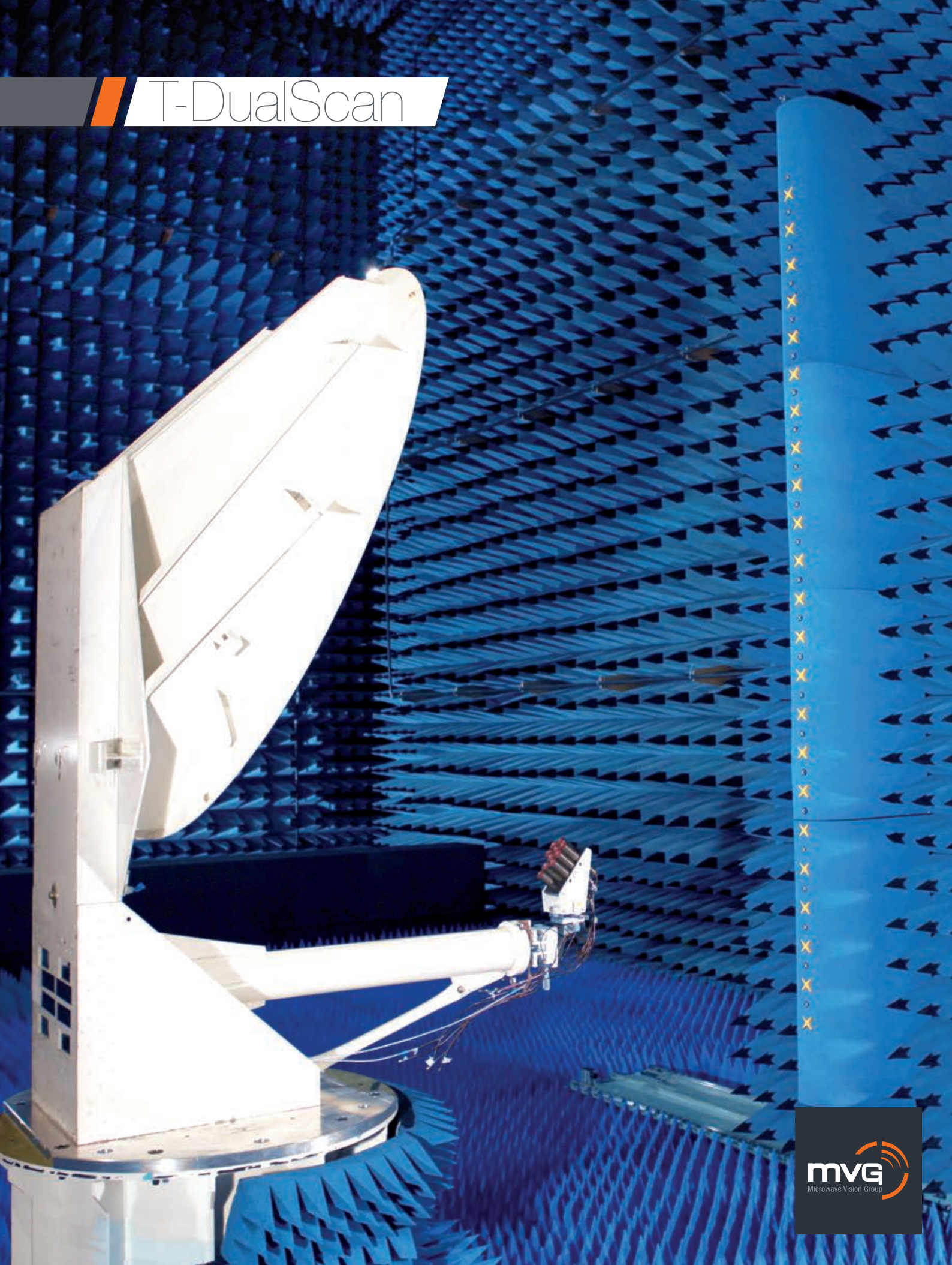
T-DualScan



Microwave Vision Group

T-DualScan is an innovative planar near-field system that offers the best compromise between accuracy, flexibility and measurement speed. The tower positioner can rotate 180° to switch easily from the single-probe set-up (0.8 - 110 GHz) to the multi-probe set-up (0.8 - 18 GHz). T-DualScan can also be offered as an upgrade to existing installations.

Easily switch from a single probe to a multi-probe set-up

SOLUTION FOR

- **Antenna Measurement**
- **Pulsed Measurement**
- **Phased Array Antenna Measurement**

Main features

Technology

- Near-field / Planar
- 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
- Beam pointing properties

Frequency bands

- Single-probe: 800 MHz - 110 GHz
- Multi-probe: 800 MHz - 18 GHz
- Multi-probe: 70 - 800 MHz on request

Scan area

- Multi-probe: up to 12 m Y axis (1 m module)
- Single-probe: up to 15 m Y axis (1 m module)
- X-axis length depends on customer requirement

Probe array oversampling capability

- Movement of the probe array on the vertical axis

System configurations

Software

Measurement control, data acquisition and post processing

- ■ MiDAS
- □ SatEnv
- □ 959 Spectrum (North America only)

Equipment

- ■ Amplification unit
- ■ Mixer unit
- ■ N-PAC
- ■ Primary synthesizer
- ■ Auxiliary synthesizer
- ■ Transfer switching unit
- ■ Power and control unit
- ■ Probe array power supply
- ■ Heavy DUT positioner
- ■ Elevation positioner for gantry arm
- ■ Positioner controller**
- ■ E-Stop unit
- ■ Local control unit**
- ■ Real time controller**
- ■ Control interface unit
- ■ Uninterruptible power supply
- ■ Instrumentation rack
- ■ Ethernet switch
- □ AUT Port switch

Add on

- ■ Calibration kit (arm, reference antenna, positioner and interface)
- □ Laser alignment instrumentation (laser inclinometer, laser tracker, spin diode laser, laser pointer, digital spirit level and dial-indicator)
- □ Absorbers*
- ○ Shielded anechoic chambers*

Accessories

- □ Reference antennas (horns, standard gain horns, etc.)****
- ○ Probes****

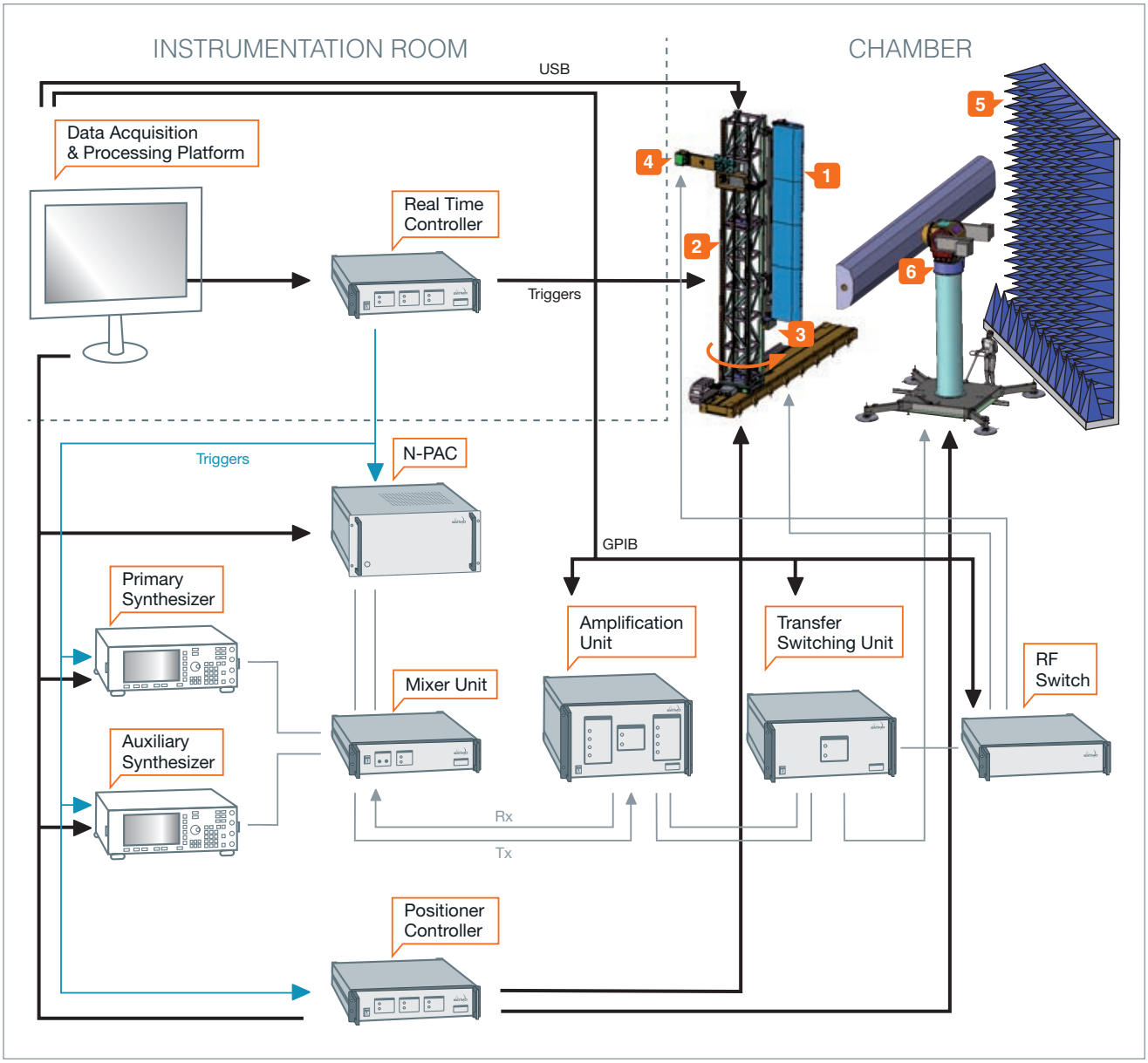
Services

- ■ Installation and calibration
- ■ Warranty
- ■ Training
- ■ Project management
- □ Post warranty service plans*****
- □ MV-Cor™ correction table service***

■ Included □ Optional ○ Required

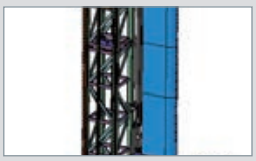
* See AEMI/ Rainford EMC Systems catalogs for more information
** See ORBIT/FR positioning equipment catalog for more information
*** See MV-CorTM service sheet for more information
**** See SATIMO & ORBIT/FR antenna catalog for more information
***** Refer to Orbit/FR service brochure for more information

System overview



Measurements can be performed in both continuous wave and pulsed mode. In the case of phased array antenna measurement, the system utilizes the real time controllers to control and synchronize the measurement system with the device under test.

Standard system components



1 Linear probe array

- From 1 to 12 meters long probe-array (StarLine) It includes by default interleaved probes to cover 0.8 to 18 GHz.
- 70 - 400 MHz probe array available on demand

2 Y axis scanner

- 1 to 15 meter high tower scanner
- Probe roll positioner

ORBIT/FR positioning equipment catalog

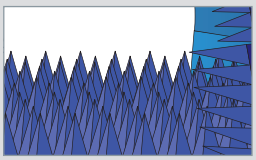
3 X axis scanner

- X Axis length depends on customer requirement

4 Antennas

- A complete range of measurement probes (single or dual polarized) and reference antennas (horns, standard gain horns) are available

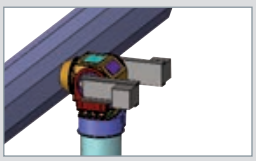
MVG antenna catalog



5 Absorbers and anechoic chamber

- An optimized combination of standard, adapted and specialty absorbers
- Anechoic chamber with integrated design, production, installation and testing services

AEMI absorber catalog



6 DUT positioning equipment

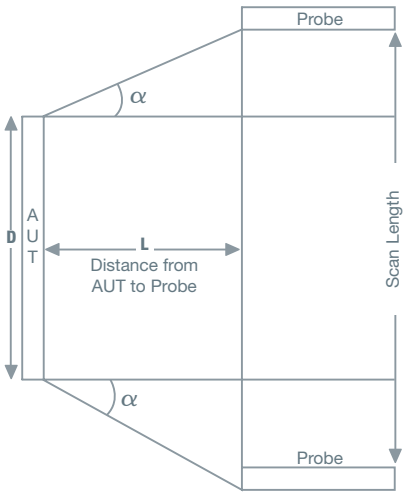
- A complete range of rotary positioners and model towers are available with air cushion (optional)

ORBIT/FR positioning equipment catalog

Quick guide to evaluate scan area requirement

The required scan area is calculated according to the following formula: Scan length = D + 2 L tg (α)

Where:
- α is the relevant data angle in far-field
- L, the distance between the probe and the AUT
- and D, the antenna size.



Sampling principle

Sampling step is based on the minimum measured wavelength (λ_{min}).

$D_{sampling} = (\lambda_{min}/2)$

System specifications Multi-probe set-up*

	30 dBi AUT
PEAK GAIN ACCURACY	
0.8 GHz - 1 GHz	± 0.5 dB
1 GHz - 6 GHz	± 0.5 dB
6 GHz - 18 GHz	± 0.5 dB
Repeatability	± 0.3 dB
- 20 dB SIDELOBES ACCURACY	
0.8 GHz - 1 GHz	± 0.6 dB
1 GHz - 6 GHz	± 0.6 dB
6 GHz - 18 GHz	± 0.7 dB
- 30 dB SIDELOBES ACCURACY	
0.8 GHz - 1 GHz	± 1.3 dB
1 GHz - 6 GHz	± 1.2 dB
6 GHz - 18 GHz	± 1.3 dB

* Table refers to radiation pattern < ± 60 deg. Specifications given according to the following assumptions:
- Controlled temperature and humidity during measurement
- Specifications on radiation pattern are given for a normalized pattern
- Measurements inside an anechoic chamber
- Peak gain is given for a ± 0.3 dB gain error on the reference antenna
- No averaging

System specifications Single-probe set-up*

	30 dBi AUT
PEAK GAIN ACCURACY	
0.8 GHz - 1 GHz	± 0.5 dB
1 GHz - 6 GHz	± 0.5 dB
6 GHz - 18 GHz	± 0.5 dB
18 GHz - 40 GHz	± 0.5 dB
Repeatability	± 0.3 dB
- 20 dB SIDELOBES ACCURACY	
0.8 GHz - 1 GHz	± 0.5 dB
1 GHz - 6 GHz	± 0.5 dB
6 GHz - 18 GHz	± 0.5 dB
18 GHz - 40 GHz	± 0.5 dB
- 30 dB SIDELOBES ACCURACY	
0.8 GHz - 1 GHz	± 1.2 dB
1 GHz - 6 GHz	± 1.0 dB
6 GHz - 18 GHz	± 1.1 dB
18 GHz - 40 GHz	± 1.3 dB

* Table refers to radiation pattern < ± 60 deg. Specifications given according to the following assumptions:
- Controlled temperature and humidity during measurement
- Specifications on radiation pattern are given for a normalized pattern
- Measurements inside an anechoic chamber
- Peak gain is given for a ± 0.3 dB gain error on the reference antenna
- No averaging

Measurement time comparison

Typical measurement time for single beam antenna(1) Multi-probe set-up*

Frequency	Number of measured frequencies	Measurement time (in hours)
3 GHz	5	0.1
3 GHz	10	0.2
18 GHz	5	3
18 GHz	10	4.5

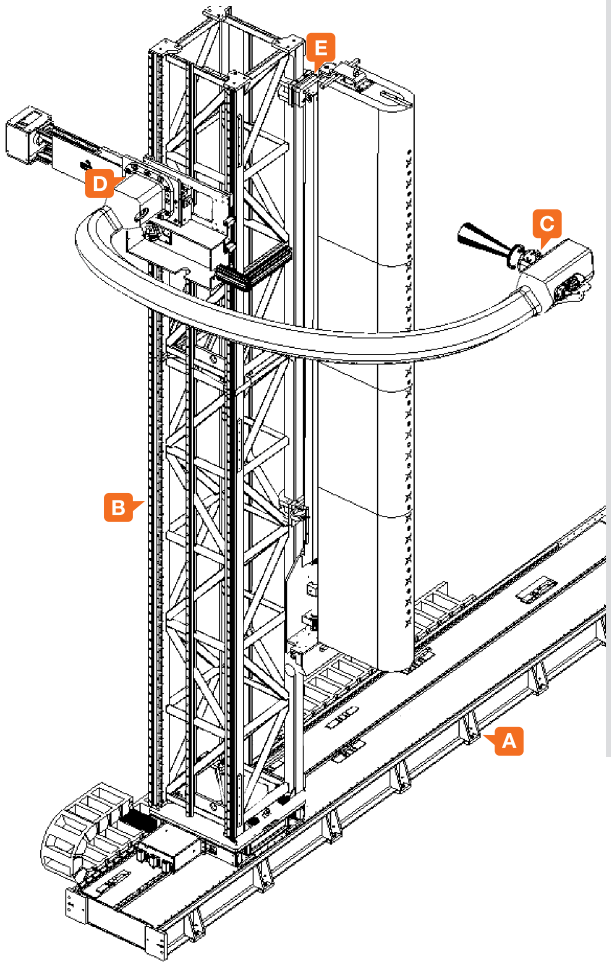
(1) AUT size 5 x 5 m

Typical measurement time for single beam antenna(1) Single-probe set-up*

Frequency	Number of measured frequencies	Measurement time (in hours)
3 GHz	5	2
3 GHz	10	2.5
18 GHz	5	21
18 GHz	10	23

(1) AUT size 5 x 5 m

Probe positioning system



A Scanner horizontal slide
- Horizontal translation of the scanner on the x axis

B Scanner vertical slide
- Vertical translation of the measurement probe and the calibration arm

C Probe roll
- Rotation of the measurement or calibration probe on the z axis

D Probe horizontal slide
- Horizontal positioning of the probe on the z axis

E Probe array vertical slide
- Vertical translation of the probe array for oversampling

F Azimuth rotation of the tower

Mechanical characteristics

Single-probe

HORIZONTAL AXIS (x)

Number of modules	1 to 6	6 to 12
Positioner series	**AL-4952 T**	**AL-4953 T**
Scan area	Slide length - 2 m	Slide length - 1.4 m
Planarity (RMS)*	0.15 mm	0.12 mm
Frequency range	0.8 - 110 GHz	0.8 - 110 GHz
Slide length	Up to 20 m	Up to 100 m
Weight	160 kg/m	350 kg/m
Velocity	300 mm/sec	300 mm/sec
Accuracy	0.13 mm	0.13 mm
Repeatability	0.025 mm	0.050 mm

* Better than stated. Further accuracy can be achieved with MV-Cor™, please see our MV-Cor™ brochure for more information.

VERTICAL AXIS (y)

Number of modules	1 to 6	6 to 12
Positioner series	**AL-4952 T**	**AL-4953 T**
Scan area	Slide length - 1 m	Slide length - 1.2 m
Planarity (RMS)*	0.15 mm	0.12 mm
Frequency range	0.8 - 110 GHz	0.8 - 110 GHz
Height (slide length)	Up to 10 m	Up to 16 m
Weight	170 kg/m	250 kg/m
Velocity	350 mm/sec	350 mm/sec
Accuracy	0.13 mm	0.13 mm
Repeatability	0.025 mm	0.050 mm

* Better than stated. Further accuracy can be achieved with MV-Cor™, please see our MV-Cor™ brochure for more information.

Probe array

Number of modules	Probe array length (cm)	Scan area (cm)	Number of probes 0.8 - 6 Ghz	6 - 18 Ghz
1	126	84	7	7
2	238	196	15	15
3	350	308	23	23
4	462	420	31	31
5	574	532	39	39
6	686	644	47	47
7	798	756	55	55
8	910	868	63	63
9	1022	980	71	71
10	1134	1092	79	79
11	1246	1204	87	87
12	1358	1316	95	95

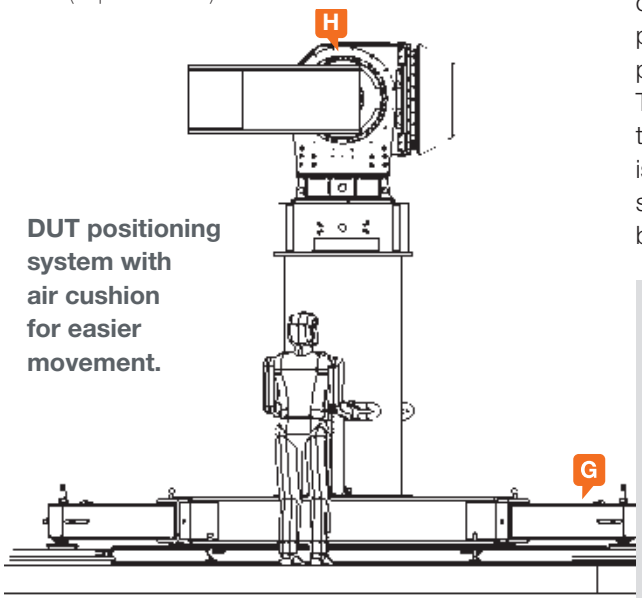
- The distance between a 0.8 - 6 GHz and a 6 - 18 GHz probe is of 70 mm
- Distance between two 0.8 - 6 GHz probes: 140 mm
- Distance between two 6 - 18 GHz probes: 140 mm

Calibration process

The probe array system calibration allows for both consistency in amplitude and in phase as well as the radio-electric axis alignment of each probe. The calibration procedure consists of the rotation of a reference antenna along a roll axis in front of each probe. This is performed with a dedicated calibration arm supporting the reference antenna and its motorized roll axis. Mounted on one of the linear axes of the scanner, the calibration arm moves linearly to position the reference antenna in front of each probe of the array.

The engineer is mounting the arm for calibration

DUT positioning system (optional)

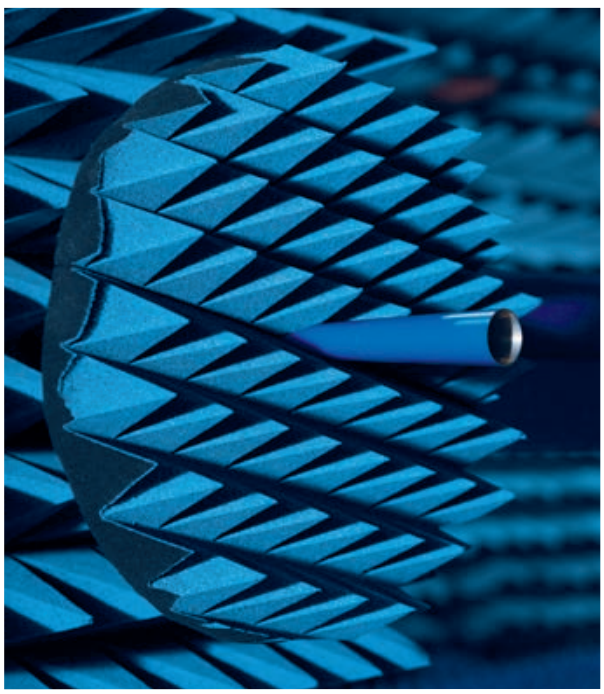


DUT positioning system with air cushion for easier movement.

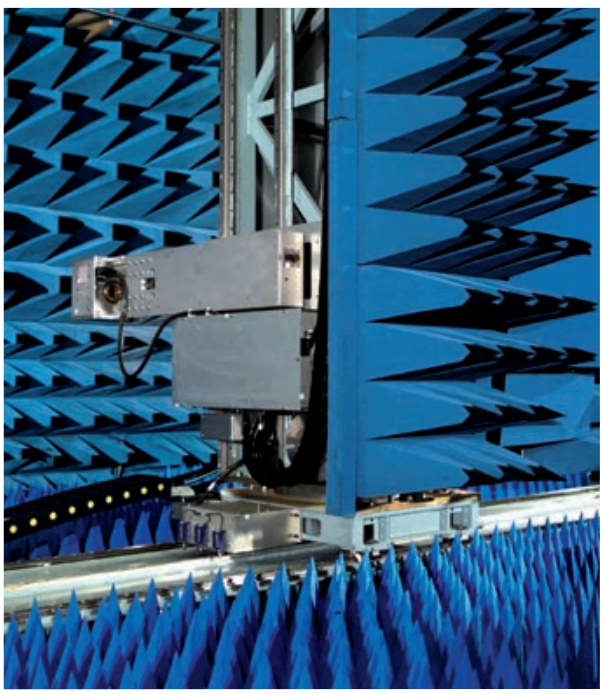
The DUT positioner is composed of standard ORBIT/FR positioning equipment that can be adapted to the specific requirements of each customer. An innovative DUT positioner base allows for easy movement of the DUT positioning equipment, thanks to four air cushion pads. To move the DUT linearly, a simple air hose is connected to the four air pads' central manifold, and the system is slightly elevated on a thin air cushion (0.08 mm). The system has virtually no friction and can be moved simply by pushing it to its new position.

G **Air cushion base**

H **Azimuth over Elevation over Azimuth positioner (AL-45xx series)**
Able to move the DUT in 3 directions:
- horizontal
- polarization
- vertical



Single-probe



Base tower with rail

Watch a T-DualScan video to find out more:
http://www.youtube.com/watch?feature=player_embedded&v=VLp4wMakVvY