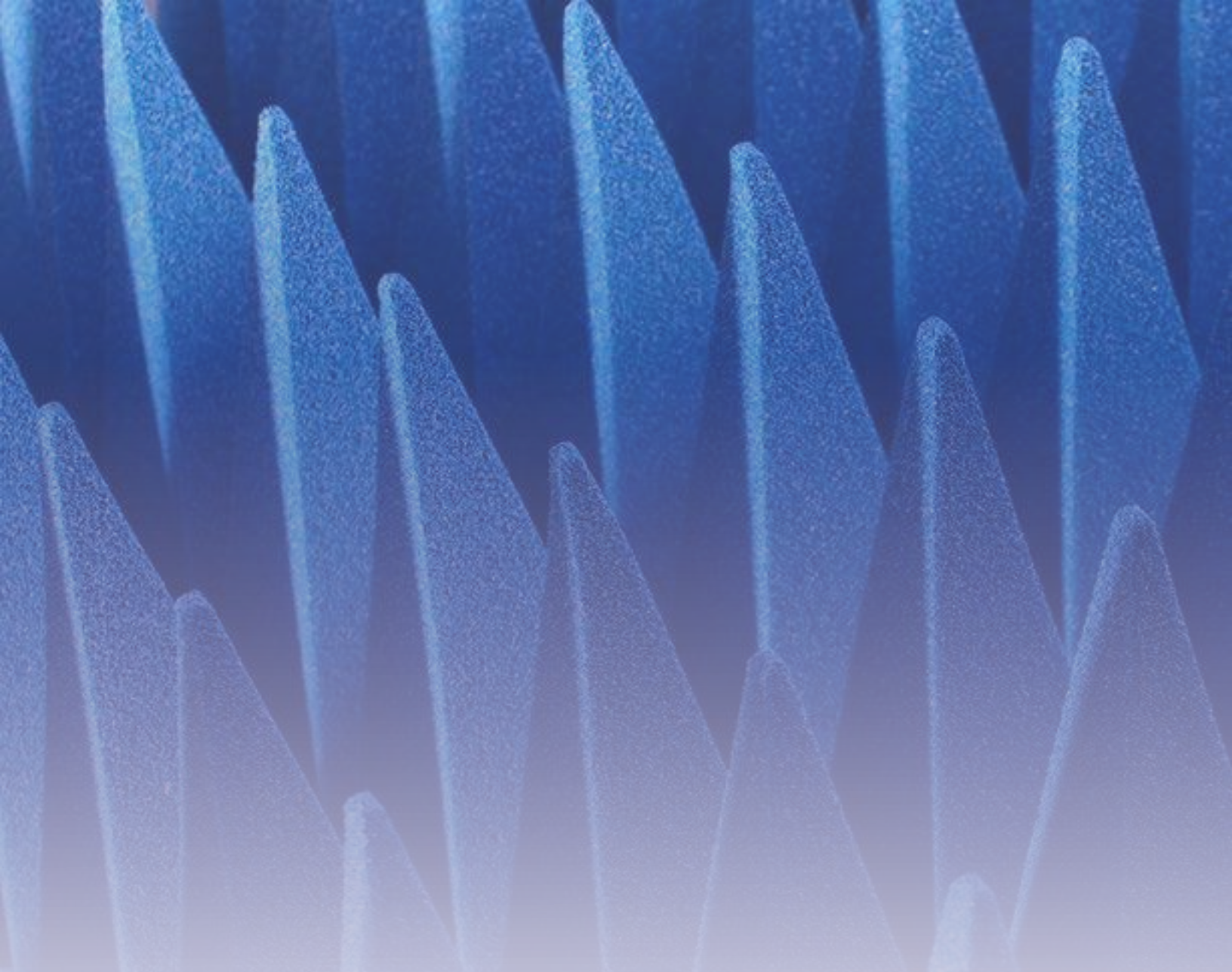
RF SOLUTIONS PORTFOLIO

VOL. 1

DVTEST™

Best Isolation. Better Results.



MISSION

“Enabling our customers to achieve more.”

VISION

“As global leaders in RF systems and custom solutions we foster an open-minded approach, embrace technological advancements, and consistently meet our customers ever evolving needs.”

VALUES

“Honesty, Integrity and Accountability in all we do.”

THE DVTEST ADVANTAGE

Superior Performance

DVTEST products are designed and manufactured to have the highest performance standards.

Customization

Don't see it in our portfolio? No problem. Let DVTEST engineering design the ideal solution for your applications.

Premium Components

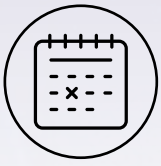
All products use the highest quality hardware such as hinges, catches and supporting electronics.

Engineering Expertise

DVTEST has a full service engineering team of Mechanical, Electrical and RF engineers to make the most complex systems a reality.

Longevity

Our units are designed to maintain performance over the life of the enclosure – resisting oxidation warping and other effects that cause performance degradation.



Project Management

Our project Management and logistics team will keep you informed of the status of the unit every step of the way.

Industry Partnerships

Respected in the industry, DVTEST has a long list of partner companies to help better serve our customers.

Quick Ship

Need it now? Due to our extensive stocking program, DVTEST can deliver a wide range of units in one week or less.

Product Selection Guide

	dbCHECK	dbGUARD	dbTENT	dbSAFE X
Loading Style	Clamshell	Clamshell	Front	Top, Front Rackmount
Chassis Wall Type	Single	Single	Double	Single
Use Case	RF enclosures suitable for repair environments and compliance testing. Drop in replacements for Aeroflex & Will'Tek.	Robust RF enclosures recommended for high volume manufacturing and automated testing.	Portable RF enclosures suitable for on-site and temporary lab environments.	Versatile RF enclosures for lab use and compliance testing. Largest usable I/O panel in industry.
Shielding Effectiveness (Isolation spec measured at each seam)	> 90 dB	> 80 dB	> 90 dB	> 90 dB
Tri-Shield© MIL-DTL-5541F Process	●	●		●
Frequency Range (GHz)	0.3 - 18	0.3 - 18	0.3 - 18	0.3 - 18
mmWave Frequency Extension Kit				
Extreme Temperature Testing				
Waveguide Cooling	Some Models	Some Models	●	●
Heavy Duty Rugged Frame Base				
Custom Sizes Available	●	●	●	●
Positioner Manual Rotation and/or Translation	●	●		●
Positioner Full Spherical Pattern				
Measurement Software (Optional)	●	●	●	
OTA Performance Verification Tools Available			●	●
Warranty	2Y	2Y	1Y	2Y
Internal Dimensions W x D x H Inches (mm)	**dbCHECK** 14" x 11.25" x 8" (356 x 286 x 203)	**S** 7" x 14.75" x 7.5" (178 x 375 x 191)	**S** 24" x 24" x 24" (610 x 610 x 610)	**TOP / FRONT** **S** 18" x 12" x 8" (457 x 305 x 203)
	dbCHECK+ 20" x 14" x 8" (508 x 356 x 203)	**M** 15" x 14.75" x 7.5" (381 x 375 x 191)	**M** 36" x 36" x 36" (914 x 914 x 914)	**M** 23" x 16" x 11.25" (584 x 406 x 286)
		L 18.6" x 16.5" x 8" (472 x 419 x 203)	**L** 48" x 48" x 48" (1219 x 1219 x 1219)	**L** 24" x 18" x 12" (610 x 457 x 305)
		Tablet Edition 15.25" x 14.75" x 3.75" (387 x 375 x 95)	**XL** 84" x 84" x 77" (2134 x 2134 x 1956)	**R9 - 9U** 21" x 15.75" x 15" (533 x 400 x 381)

Product Selection Guide

	dbSAFE DUO	dbSAFE RME	dbSAFE TSE	dbSAFE MAX	dbSAFE ARMOR
					
	Top Front	Rackmount	Top Front	Front	Front
	Double	Double	Double	Single / Double	Double
	Customizable RF enclosure offering the most repeatable environment and best overall performance on the market.	19" and 23" EIA rackmount RF enclosure optimized for data throughput and regression testing.	Temperature and RF enclosure recommended for lab use, compliance testing, and research & development.	Customizable large format RF enclosure suitable for larger DUTs and test setups, automation, or multi-device testing.	Advanced, modular RF enclosures recommended for multiple frequency ranges and OTA applications.
	> 100 dB	> 100 dB	> 100 dB	> 100 dB	> 100 dB
	●	●	●	●	●
	0.3 - 18	0.3 - 18	0.3 - 18	0.3 - 18	0.3 - 90
			●	●	●
	●	●	●	●	●
				●	●
	●	●	●	●	●
	●	●	●	●	●
				●	●
	●	●	●	●	●
	●	●	●	●	●
	3Y	3Y	2Y	3Y	3Y
	TOP **S** 11" x 8.5" x 5.5" (279 x 216 x 140)	**4U - 19"** 14" x 20" x 4" (356 x 508 x 102)	**TSE** 16" x 10" x 7" (406 x 254 x 178)	**MAX DUO** 18" x 24.5" x 30" (457 x 622 x 762)	**3232** 32" x 32" x 32" (813 x 813 x 813)
	M 17" x 11" x 8" (432 x 381 x 203)	**7U - 19"** 14" x 20" x 9.25" (356 x 508 x 235)	**TSE Hybrid** Upper: 16" x 9" x 6" (406 x 229 x 152) Lower (Thermal): 16" x 9" x 7" (406 x 229 x 178)	**MAX DUO+** 32" x 32" x 32" (813 x 813 x 813)	**4242** 42" x 42" x 42" (1067 x 1067 x 1067)
	L 24" x 15" x 13" (610 x 381 x 330)	**10U - 19"** 14" x 20" x 14.5" (356 x 508 x 368)		**MAX X** 24" x 24" x 24" (610 x 610 x 610)	**2418R** Upper: 24" x 27.5" x 24" (610 x 699 x 610) Lower: 24.5" x 28" x 7" (622 x 711 x 178)
	FRONT **M** 17" x 11" x 8" (432 x 279 x 203)	**10U - 23"** 21" x 20" x 14.5" (533 x 508 x 368)		**MAX X+** 36" x 32" x 36" (914 x 813 x 914)	**3270** 32" x 24" x 70" (813 x 610 x 1778)
	L 24" x 15" x 13" (610 x 381 x 330)	**13U - 23"** 21" x 20" x 19.75" (533 x 508 x 502)			**5242** 52" x 42" x 42" (1321 x 1067 x 1067)

WiFi Testing and Emulation Solutions

TR-398 WiFi Testbeds

The TR-398 test plan qualifies the performance of WiFi APs. Candelatech LANforge with DVTEST enclosures provide an automated solution.

WiFi Mesh Testing

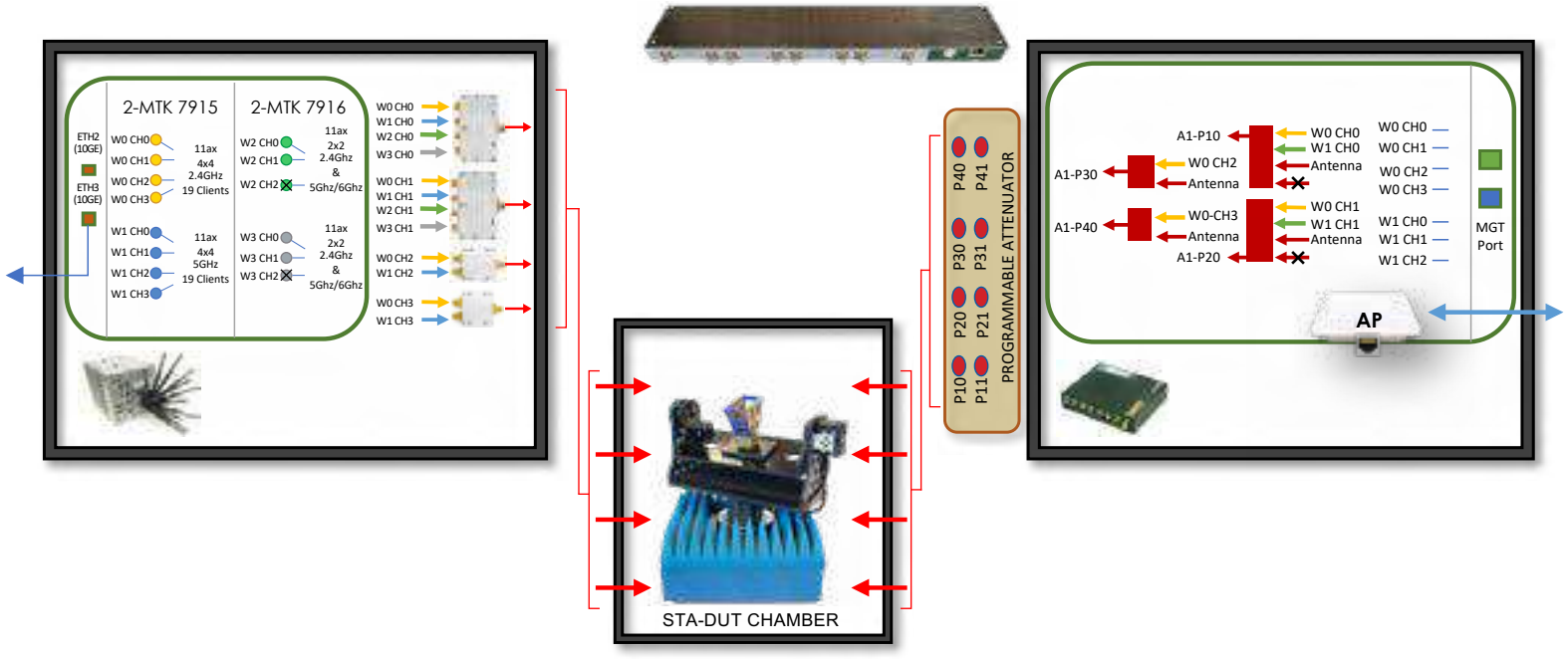
Emulate mesh node areas with isolation chambers while LANforge emulates clients' stations. Use graphical controls to emulate physical distance.

High Density Test Beds

Test AP's using multiple test enclosures (up to 24) each with dedicated LANforge Test emulators.

EXAMPLE BLOCK DIAGRAM

RATE vs RANGE vs ORIENTATION TEST BED

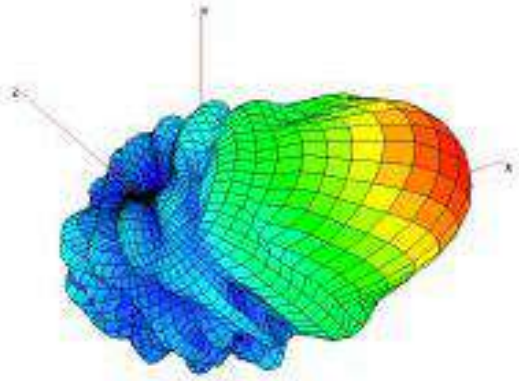


Test how well the AP can transmit packets at different signal levels. This is a good test of the AP's rate-control logic, as well as tx power and general ability to deal with various RF conditions. This emulates a throughput test as the user walks away from the AP.

OTA Performance Testing

Near Field to Far Field Transformation

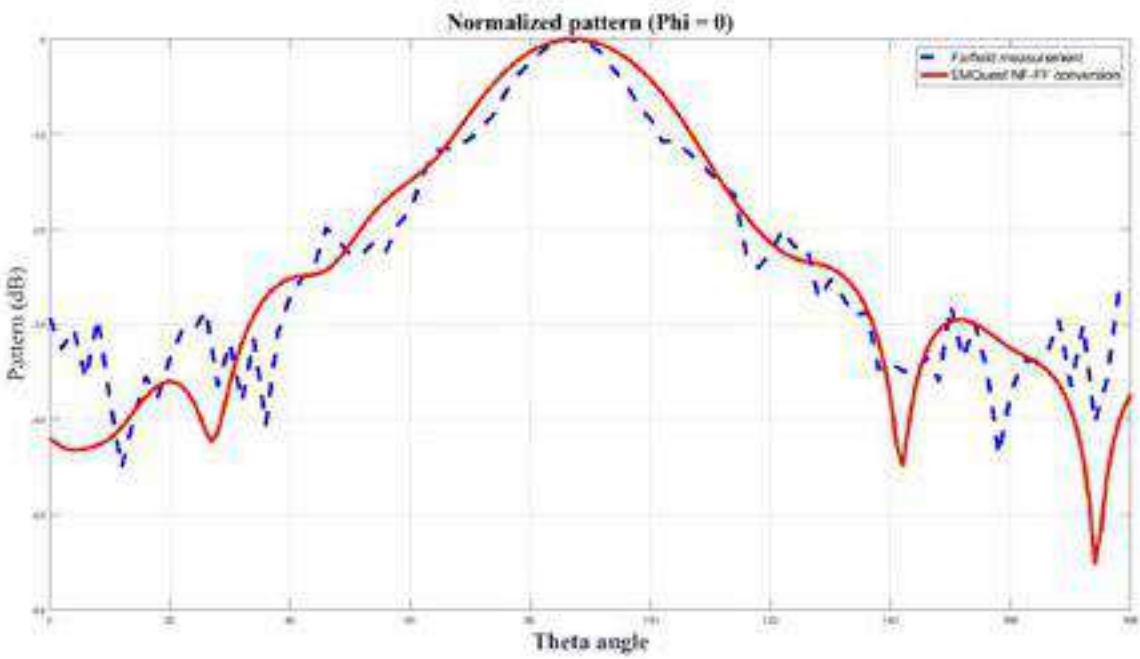
DVTEST in partnership with ETS Lindgren are proud to announce that the EMQuest Antenna Measurement Software, including the Near Field (NF) to Far Field (FF) measurement suite, is now fully compatible with select DVTEST enclosures and positioners. NF to FF Transformation reduces your costs and your test time!



Test Results

The NF data gets collected and transformed into FF results as indicated by the red line in the graph below. For comparison, the blue dotted line represents results as performed in a large walk-in chamber (Direct Far Field).

As a result of existing misalignment between the AUT and the probe, and the reflections from the walk-in chambers interior surfaces, some ripples appear below 40°. The NF data measured within a portable anechoic enclosure “dbSAFE ARMOR” does not display this ripple as they are inherently designed for NF measurements.



RF Testing at Temperature

RF Temperature Forcing System

DVTEST offers a variety of products and solutions tailored for RF testing over a range of temperatures. Increasingly, devices need a combined RF-thermal test even if separate RF and thermal test setups were sufficient for the previous generation of devices.

DVTEST Thermal Shielded Enclosures (TSE) units are driven by forced air systems and are flexible test setups that can accommodate a wide range of device types and sizes. In a forced air system, the RF enclosure is connected to a thermal forcing unit. The thermal forcing unit floods the RF enclosure with hot or cold air, while the enclosure provides an isolated RF environment with appropriate I/O connections for the RF test. The enclosure for this test is a unique design, with both RF and thermal shielding, allowing the enclosure to reach extreme temperatures without affecting the RF performance. This test setup is ideal for testing device function at a particular temperature, this is the most realistic way of mimicking temperature for typical device use cases.

Dual-Chamber Thermal Test Enclosure

DVTEST also offers a dual-chamber version of the thermal test enclosure. This allows for test setups that include additional peripheral equipment in the RF-isolated environment, without exposing this equipment to temperature extremes.

Direct Contact System

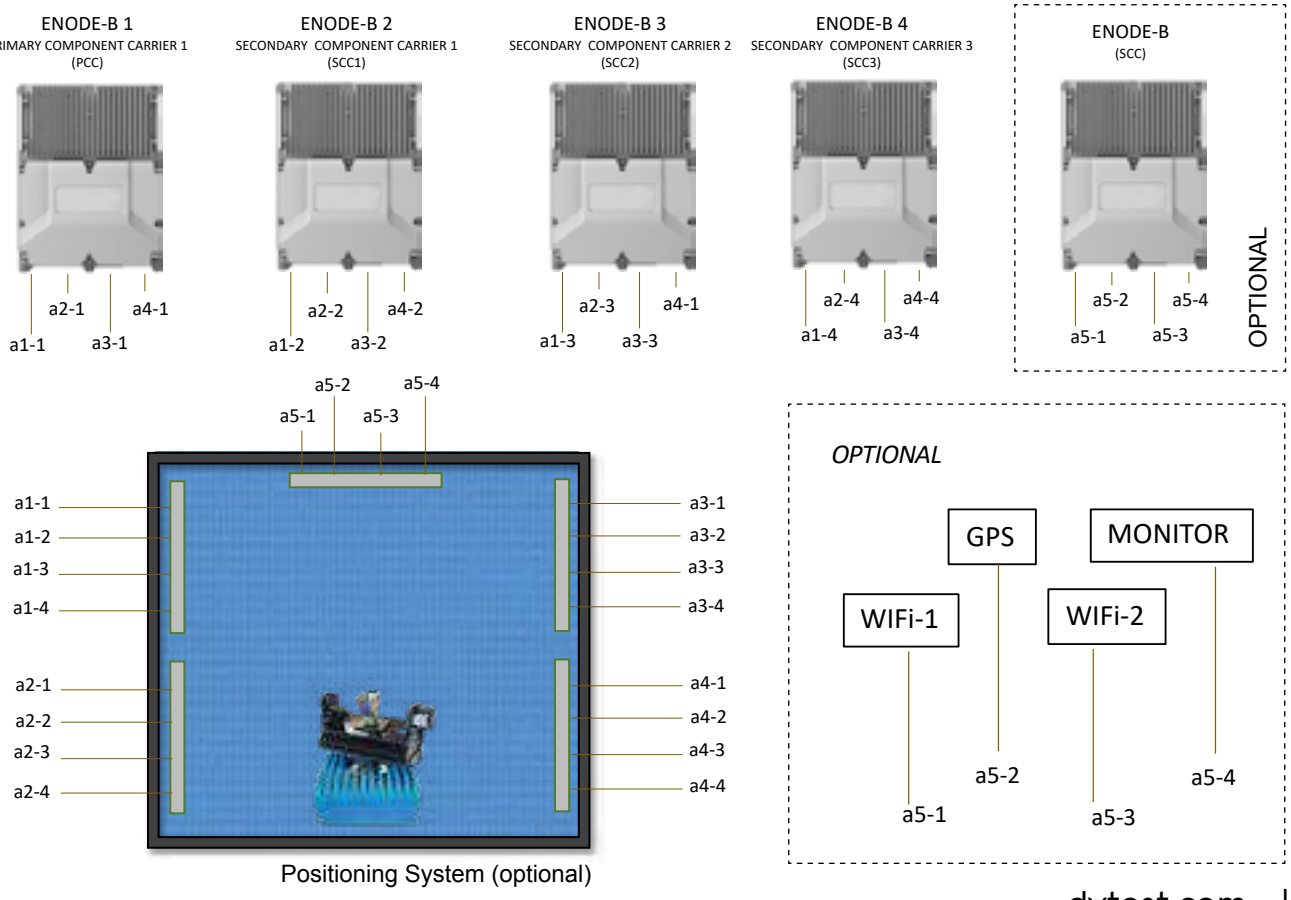
In a direct contact system, a thermal head makes contact with the DUT, efficiently heating or cooling the device without needing to heat or cool the entire enclosure. The thermal head is snaked from the thermal forcing unit into the enclosure through an RF-isolative fabric sleeve.

Radiatiative Antenna Module (RAM) Enclosures

In order to conduct OTA testing for wireless connectivity, selecting the appropriate antennas is crucial as their type and performance vary depending on the specific application. The physical size of the antennas can pose a challenge to achieving a compact solution. In most instances antennas are attached/placed into a RF enclosure primarily based on mechanical placement limitations and not optimized for RF performance.

The objective of the RAM Enclosure is to create a predefined quasi-uniform radiated zone within the enclosure body. To establish such a quasi-uniform radiative zone, the RAM is comprised of specially designed, multiple antenna arrays distributed over enclosure walls. RAM enclosures can contain up to 20 antenna elements (5 arrays, 4 antennas each) and are designed to function at frequencies from 700 MHz to 7 GHz.

Example Configuration of Four Component Carrier Aggregation with MIMO



The DVTEST Advantage: Customization

DVTEST specializes in providing customized enclosures tailored to meet a wide range of specifications, spanning from compact sub-6 GHz benchtop units to expansive mmWave (90 GHz) test ranges.

Our comprehensive approach to test integration ensures that you receive a turnkey solution perfectly suited to your requirements. Opting for a custom RF enclosure offers several advantages over off the shelf alternatives, taking into account varying application demands, size considerations, budget limitations, and testing prerequisites.

There are several reasons to choose a custom RF enclosure over an off the shelf enclosure. Requirements can vary based on applications, size, budget constraints, and testing needs.

Applications: Custom enclosures cater to diverse applications, including thermal applications, WiFi testing, comprehensive OTA/antenna characterization systems, and spurious emissions tests. The nature of the specific application significantly influences the enclosure's design, ensuring optimal performance and functionality.

Size: Physical dimensions of the enclosure can be crucial for the test. Additionally, limited lab space is always a concern and may determine the maximum or minimum size of the enclosure.

Automation: Enclosures used for automated testing may require control stations, positioners, and specific interfaces to automate equipment or ensure safety functions.

Customization Examples:

Dual Door OTA Test Range:
Horizontal mmWave OTA test range equipped with positioner and probe antenna. Dual door ensure operators have full and easy access to the enclosure interior.

Addition of the cart allows for the enclosure to be easily moved around a lab or workspace.

Customization Examples:

Automated Test System:
Pneumatically automated Bed-of-Nails fixture integrated to the enclosures complete with 2 hand control station.

Viewing Window and Gloves:
RF shielded viewing windows can be added to select enclosures to allow for real-time monitoring of devices.

RF shielded gloves provide hands on access to the DUT during testing. To ensure optimum RF performance a removable door option is available for when the gloves are not in use.

Units can have items added separately.

OTA mmWave Thermal Testing:
DVTEST combines mmWave and thermal testing with enclosures such as this one - Offering a wide frequency range of 300 MHz to 90 GHz it features a roll-over azimuth positioning system for precise antenna measurements. With a unique thermal “micro environment,” it enables extreme temperature control from -80 to +180° C when paired with a temperature forcing unit.

DVTEST™
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Performance Matters.

The Enclosure is an Integral Part of the Measurement Solution.

A high quality, repeatable environment reduces setup, calibration and test time and delivers results that can be counted on being accurate – ultimately reducing costs and shortening test times.

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