MONOLITHIC RF FRONT-ENDS

One structure. A simpler RF front-end.

Pantenna consolidates the passive RF chain between active electronics and free space into one metal body made by precision additive manufacturing.

The architecture integrates the PCB launch, impedance matching, routing and radiator. Variants can also incorporate mode conversion and polarisation control, with direct 50 Ω PCB integration.



Illustrative discrete RF chain (left) and monolithic counterpart (right) at V-band

LOWER LOSS

Fewer interfaces reduce associated RF losses.

FASTER INTEGRATION

Fewer components and RF interfaces to assemble and verify, reducing integration complexity and potentially lowering overall system cost.

SWaP-Driven DESIGN

Designed to reduce system mass, volume and interface count for SWaP-constrained applications.

TYPICAL 50 Ω DIRECT ELECTRONICS INTERFACE

A familiar route from the PCB.

GCPW or microstrip interface options, with launch geometry matched to the chosen PCB stack-up. Pantenna follows a conventional PCB-edge end-launch mounting approach, replacing the standard RF connector with a direct transition into the passive front-end.

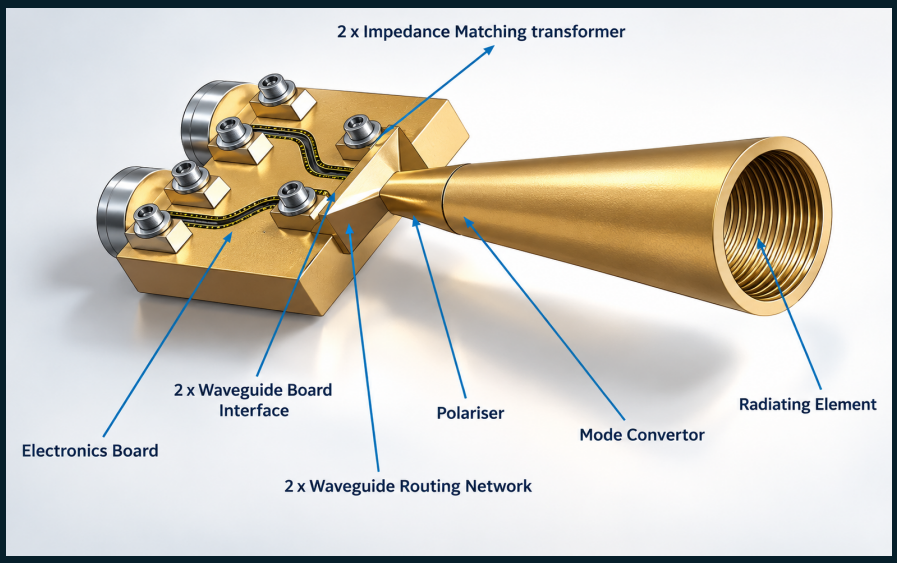
ACTIVE RF
PA / LNA / transceiver

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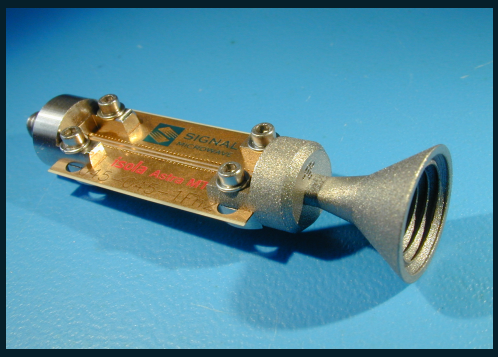
50 Ω PCB LINE
GCPW or microstrip

›

PANTENNA
Passive chain + aperture



Dual-polarised architecture



Manufactured hardware (W-band)

MWF-W90-SP-001 REFERENCE

Characterisation band
80-110 GHz
Polarisation
Single linear
Height / horn diameter
19.94 / 13.14 mm
Interface width
6.35 mm
Material
17-4 PH stainless steel

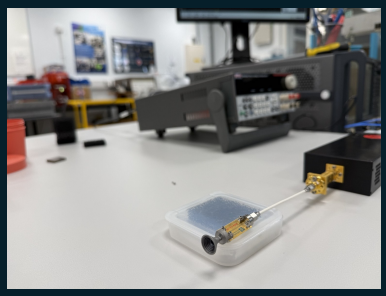
Reference PCB: Isola Astra MT77 GCPW; 4.9 mil thickness; Dk 2.9. Line width 10.75 mil; launch taper 7 mil × 35 mil; no soldermask at the launch.

Measured reference: GCPW. Target-board grounding, mounting, shielding and dual-feed spacing are agreed for each evaluation configuration.

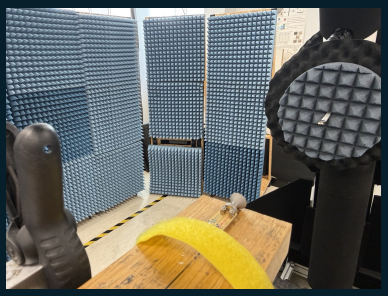
FIRST EXPERIMENTAL VALIDATION

W-band hardware, measured.

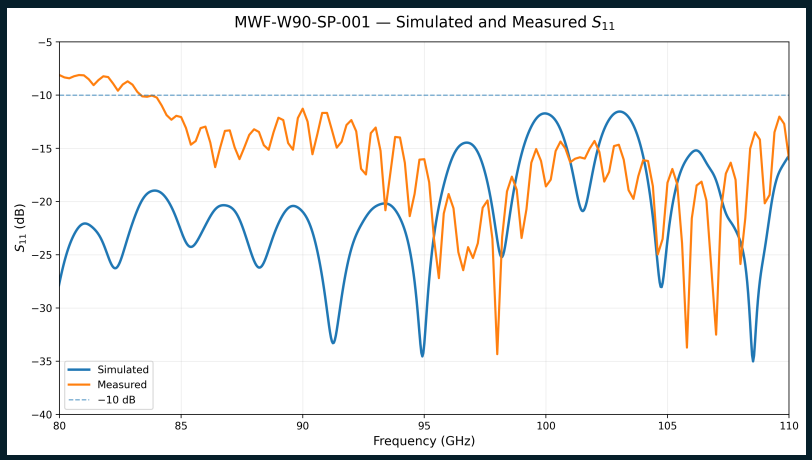
The first single-linear prototype was tested at the UKRI National Millimetre Wave Facility.



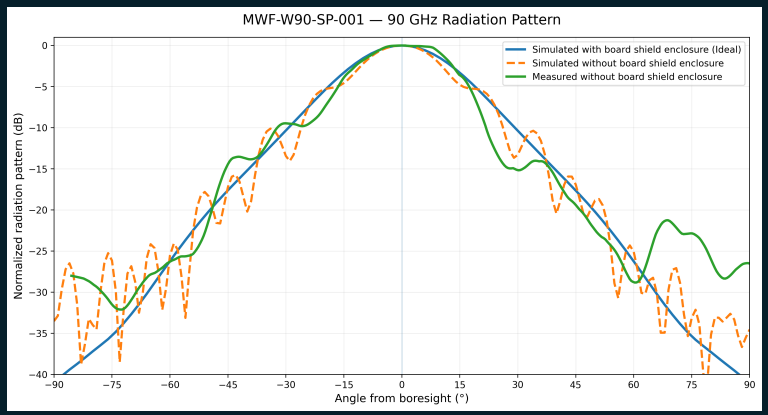
S-parameter characterisation



Antenna-range measurement



80-110 GHz | Measured and simulated input reflection (S11)



90 GHz | Measured and simulated normalised radiation pattern

Initial unplated, unshielded tests reproduce the principal beam. Mismatch and pattern ripple remain under investigation. Next: plated/shielded characterisation and gain measurement. Reference design gain: 14-15 dBi; not yet a measured result.

MATCH THE HARDWARE TO THE SYSTEM

Frequency. Gain. Polarisation.

Tailor the operating band, polarisation, beamwidth and envelope around the application, while retaining a direct 50 Ω PCB launch approach.



SIMULATED DESIGN FAMILY

Frequency: 50-120 GHz

Simulated gain: 7-24 dBi

Polarisation: single linear, dual linear or dual circular

CONFIGURABLE DESIGN SPACE

DIRECT 50 OHM INTEGRATION

A compact PCB launch provides a practical electronics-to-aperture interface.

ARCHITECTURE OPTIONS

Single-linear, dual-linear and dual-circular polarisation variants can be explored.

APPLICATION-LED DESIGN

Frequency, gain, beamwidth and package envelope are tailored around the system need.

APPLICATIONS

SPACE & SATCOM

Compact terminal and dish/lens feeds where mass and packaging matter.

RADAR & SENSING

Directional or polarisation-sensitive systems needing waveguide functions.

HIGH-FREQUENCY LINKS

E/V/W-band systems needing a simpler electronics-to-aperture chain.

INSTRUMENTATION

Specialist test and scientific systems requiring tailored high-frequency feeds.

Single-linear, dual-linear and dual-circular designs can be explored. Each selected variant requires its own manufacture and characterisation; environmental qualification follows the application.

PASSIVE MULTIBEAM, ONE SHARED APERTURE

Multiple beams. One passive aperture.

A configurable all-metal N-port lens architecture delivering independently selectable beams from a shared aperture - without active beam-forming phase shifters.



SIMULTANEOUS INDEPENDENT BEAMS



LENS INTEGRATED WITH ELECTRONICS MODULE

UP TO 21	+/- 62 DEG	40%	UP TO 23 dBi	ALL-METAL
independent beams	coverage	fractional bandwidth	gain	no dielectric losses

LOW-WEIGHT, FREQUENCY-SCALABLE PLATFORM

The same core architecture scales across frequency. Current design targets are below 95 g at W-band and below 250 g for a 60 GHz V-band version.

W-BAND: <95 g | V-BAND (60 GHz): <250 g

PASSIVE SWaP, COST & DIRECT ELECTRONIC INTERFACE

A single shared aperture and direct electronic interface reduce component count, RF interconnects, weight and assembly burden. Passive beam selection removes active phase-shifter networks and their associated DC power, thermal and control complexity.

A configurable Pantenna architecture for compact radar, sensing, communications and space terminals.

HELP SHAPE THE NEXT HARDWARE

Tell us what your system needs.

Pantenna is opening an evaluation programme to shape new variants. Share your requirement to explore a suitable configuration - no purchase commitment to register interest.

WHAT SELECTED EVALUATORS RECEIVE

Hardware in an agreed configuration, following the planned validation stage.
Interface drawings and PCB integration guidance.
Available measured RF data, with the test conditions identified.
Technical support to plan integration and review the system results.

SEND A SHORT REQUIREMENT SUMMARY

RF performance	Band, polarisation, gain / beamwidth and RF targets.
PCB interface	GCPW / microstrip stack-up, module or board, port layout.
System & timing	Application, envelope, environment and evaluation timing.

WHAT WE ASK IN RETURN

Evaluate the hardware in your intended system and share agreed feedback on RF performance, ease of integration and suitability for the application. Together, we use those results to refine the configuration and assess the next step.

We agree configuration, validation data, availability, timing, evaluation scope and loan or supply terms before hardware is sent. Participation does not require a subsequent product order.

Share your specifications: info@pantenna.co.uk