bloomice™

GLOBAL COMMUNICATION HARDWARE

EST. 2001 · UNITED KINGDOM

BESPOKE ENGINEERING

Antenna Design Services 2026

BESPOKE CABLE ASSEMBLY AND ANTENNA SOLUTIONS

INTRODUCTION

Design Services

Our products have been integrated, installed and deployed worldwide since 2001, and our bespoke Product Development Team work closely with our customers to produce millions of precision-engineered, bespoke antenna and cable solutions for use in communication systems of all kinds.

Each year, thousands of new concepts utilising existing and developing technologies come to fruition.

Our product development team are leading-edge innovators in the manipulation of antenna and cable forms and technologies that result in optimised communications which are critical for the efficient operation of all wireless devices. Bloomice have decades of experience designing industry-leading embedded antennas on many globally based signal-frequency platforms.

This brochure provides some detailed commentary on the skills and services available from Bloomice.

Please contact us at enquiry@bloomice.com for more information or to discuss your project needs.

Some of the services detailed are available within other territories subject to local network considerations and conditions.

CONTENTS

PROCESS

Our Product Development Cycle

1

DEFINITION AND FEASIBILITY STUDY

- Evaluation of wireless protocols to be utilised
- Product and project performance targets
- Agreed measurement criteria
- Agreed project timescales

2

CONCEPT

- Board design and layout
- Antenna topology
- Placement and operational environmental considerations
- Required electrical & mechanical characteristics

3

DESIGN

- CAD design / layout
- Simulated performance data
- GND connections / layout
- Antenna structure & trace patterns

4

PROTOTYPING, TESTING AND MEASUREMENT

- Passive measurement analysis
- Active measurement analysis
- Tuning
- Matching circuitry
- Debugging and troubleshooting

5

TOOLING AND SECONDARY TESTING

- Phase 1 tooling
- Primary manufacture run
- Secondary electrical testing and reporting
- Mechanical evaluation report
- Pre-certification analysis and reporting

6

FINAL PRODUCTION

- Secondary production run
- Production line auditing
- Commercial and logistical agreements finalised

CONSULTATION

Product Definition and Concept

Our design & development team are on hand to meet and discuss your project aims and ambitions. The antenna and its performance is a critical element in the performance and form of the finished product, and so early-stage discussions regarding the concept are essential.

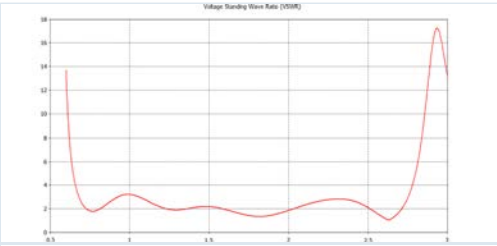
KEY CRITERIA AT THIS EARLY PHASE

- Physical requirements and restrictions
- Electrical & mechanical specification
- Construction materials available
- Proposed mounting method
- Proposed layout structure
- Frequency / bandwidth requirements
- Desired efficiency criteria
- Power consumption
- Deployment (geography / target markets)
- Targeted approvals and certification
- Development timescales
- Commercial targets & constraints

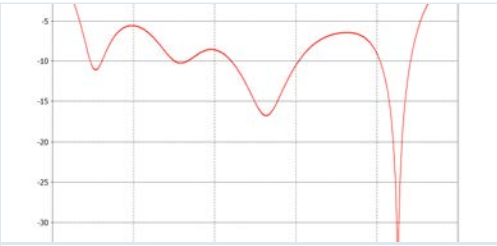
Our strong engineering pedigree means that we are perfectly placed to develop product from initial conception through to final production.

Following initial discussions around key criteria, we provide some physical detailed design data underwritten by a detailed simulated performance report for the design, which will outline expected VSWR, return loss, efficiency values and radiation pattern.

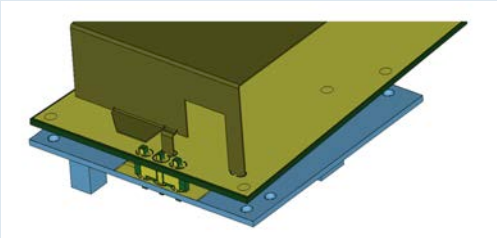
Our prototyping capabilities include semi-functional and fully functional prototypes with 3D-printed material and printed circuit boards.



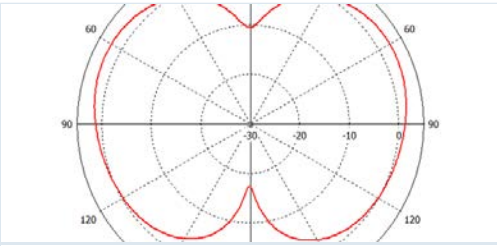
SIMULATED VSWR CHART



RETURN LOSS



SIMULATED CAD DRAWING



FAR-FIELD 2D PLOT

TESTING

Antenna Testing Services

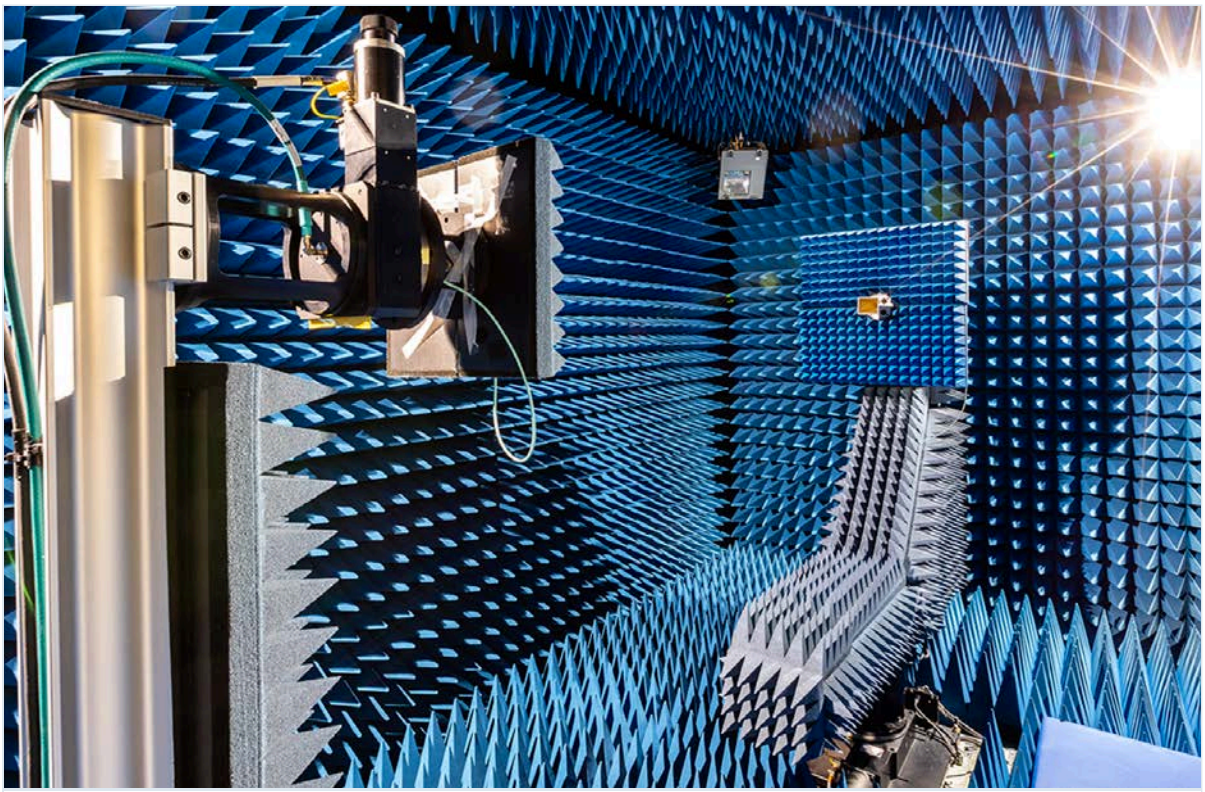
To fully understand the performance of an antenna, it is important to measure the radiated performance. This is best achieved using a fully anechoic chamber, which eradicates unwanted reflections that would otherwise impede the measurement. We provide a full 'Antenna Test Service' in order to characterise the radiated performance.

OUR EQUIPMENT LIST COMPRISES

- Chamber @ 1.5 m × 2.5 m lined with Soliani HPP30 ultra-broadband carbon-loaded polyurethane foam absorbers providing 25 dB attenuation @ 500 MHz and 40 dB attenuation @ 3 GHz
- Test Antenna 1 — Hyperlog 4060 (400 MHz to 6 GHz logarithmic-periodic)
- Test Antenna 2 — Compower AH-118, 700 MHz to 18 GHz horn antenna
- Test Antenna 3 — RF Echo OBH-690, 600 MHz to 9 GHz horn antenna
- Positioner — DAMS 6000, DC–18 GHz antenna measurement system with Full Spherical Mount (FSM)
- DAMS Antenna Measurement Software Studio

KEY PERFORMANCE PARAMETERS

- Peak gain
- Gain v Angle
- Efficiency
- Directivity
- Polarisation (2D or 3D far-field radiation patterns)



FULLY ANECHOIC TEST CHAMBER · 0.4–8 GHZ SOLIANI-LINED FAR-FIELD RANGE · DAMS 6000 / FSM POSITIONER

SPECIALISM

Embedded Antenna Design

An embedded antenna is a critical component of any wireless system; therefore, early-stage planning is essential to maximise performance whilst reducing delays and additional costs in later phases of the project.

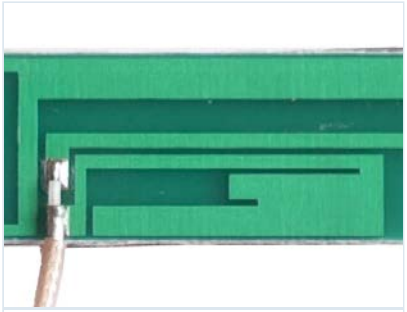
There are a myriad of embedded antenna configurations available, including:

- Etched antenna
- Metal-formed antenna
- LDS (Laser Direct Structured)
- Ceramic patch

Whatever the choice, the optimum size for an antenna is defined by the laws of physics, and although there are several techniques available which enable the reduction in the overall size of the antenna system, these generally result in a compromise in performance. In short, the smaller the antenna for a given operational frequency and bandwidth, the less efficient it will be.

To ensure any wireless product exhibits good range performance, an efficient antenna system is essential, and so sufficient space must be allocated. It is therefore essential that the antenna is considered at the earliest possible stage of the product development cycle, so that the design options and any potential compromises can be highlighted and the design modified if necessary.

CERAMIC PATCH ANTENNAS



EMBEDDED PCB ANTENNA

LOCATION

It is generally the case that the antenna will likely be located at the extremities of the product. It will therefore be sensitive to its location in relation to the external environment. Consideration should be given to how the product is going to be used and utilised, and where it is likely to be sited. For example, with a hand-held device, we must ensure that the embedded antenna is not masked by the user's hand when held in its natural state.

As a further example, is a wall-mounted device likely to be mounted on a metallic surface? If so, this will significantly impact performance if it is not catered for at an early stage of the design process.

MATERIALS

Whether the antenna structure is to be etched on to the PCB, metalised on to plastic or formed by a stamped metal element, it is essential that materials in contact with, or adjacent to, the antenna have known and stable dielectric properties. The dielectric of FR4 PCB material can vary significantly from vendor to vendor and even from batch to batch; it is therefore important that the PCB material characteristics are identified at an early stage.

For Laser Direct Structured Antennas (LDS), where the antenna is metalised on to a plastic substrate, the RF characteristics of the plastics must be fully quantified.

CASTINGS & COATINGS

To ensure strong antenna performance, it is critical that the antenna is not metallically encapsulated, that the housing / enclosure is not of a metallic substance, and that any external coating is not metallic.

ANTENNA COUNTERPOISE

The general referencing of an antenna within a system usually refers to its physical structure (i.e. an etched section of the PCB or a metalised area of the case plastics); however, in many cases this is just one half of the equation.

The other part of the antenna (the counterpoise) is usually formed by the primary ground in a system. This would typically be a main PCB ground or product chassis. The design must therefore ensure that there is a sufficient counterpoise to allow the antenna to resonate at desired frequencies, whilst simultaneously ensuring that the antenna's radiation pattern does not become distorted.

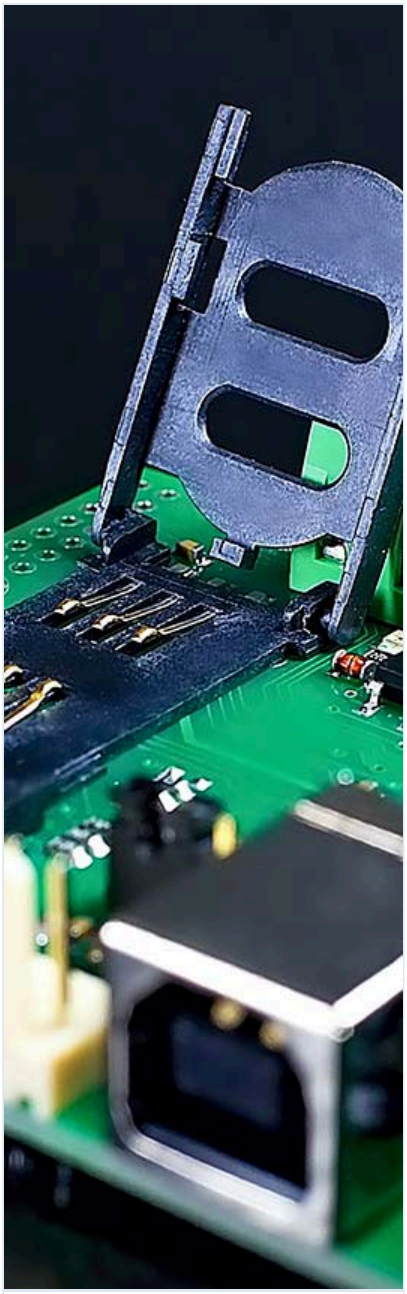
INTERNAL STRUCTURES

The position of internal metallic structures relative to the antenna can also impact performance. For example, with handheld or wearable devices, the product's battery is likely to be a major component part of the overall assembly and, as such, its position and role within the antenna system should be defined. In some circumstances, the battery may be grounded, either directly or capacitively by virtue of its position relative to the main PCBA; however, it may also be isolated, or even designed to be part of the main antenna structure. In all circumstances the position and / or potential impact on the performance of the antenna should be carefully considered.

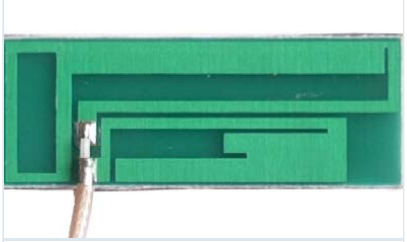
CIRCUIT SENSITIVITIES · EMI / RFI

Wireless communication systems consist of at least one transmitter and one receiver. A transmitter has the potential to generate interference to nearby circuitry, and the receiver may be susceptible to interference from the same local circuits.

Positioning of the antenna relative to sensitive or electrically noisy circuitry is therefore critical to maintaining good wireless system performance. It is therefore important that the effects of EMI (Electromagnetic Interference) and RFI (Radio Frequency Interference) are considered at an early stage, in order to identify susceptible circuitry as well as potential interference sources, and to mitigate their effect.



RF CIRCUIT ASSEMBLY ·
EMBEDDED ANTENNA UNDER TEST



EMBEDDED PCB ANTENNA

ENGINEERING

RF Circuit Test and Design

Bloomice have an enviable track record in the development of Bluetooth, Bluetooth LE, DECT, Wi-Fi and UWB consumer electronics, from initial concept, prototype and pilot production through to the provision of a full support package at post-production stage.

We are leaders in the provision of the design, development and support stages that are essential elements in the project design cycle. Our specific areas of expertise include:

- Design of RF analogue / digital circuits
- Productisation of compact consumer IoT devices
- Development of IoT-based wearables
- Firmware development
- Mechanical design
- PCB layout & design
- Assembly & manufacturing

NOISE DEBUGGING

Any unwanted signal can be detected as 'noise'. Unwanted noise is a critical issue in any wireless communication system and, if not managed via design, has the capability to negatively impact the overall end-user experience.

Bloomice provide specialised and sophisticated techniques and services designed to identify, analyse and rectify issues caused by unwanted noise.

SPECTRUM ANALYSER · SIGNAL & NOISE CHARACTERISATION

ADVISORY

RF Consultancy Services

Some of our strongest long-term customer relationships have been founded on our commitment to providing commentary and analysis on incumbent antenna systems, whether to commend and compliment a design, to provide commentary on potential minor amendments that may be considered in order to further improve performance, or to highlight potential design flaws.

In all cases, any investigative analysis that we undertake is always entirely objective and underwritten with a complete, consistent and detailed reporting mechanism.

For projects still to come to fruition, we are happy to provide some initial cost-free and risk-free analysis regarding the potential and possible design(s) of antenna that may best be suited for use within or alongside your concept.

ADDITIONAL CONSULTANCY SERVICES

- Board-level component testing
- Antenna ground layout
- Efficiency measurement
- VSWR & return loss analysis
- Tuning & matching circuitry specification and documentation services
- Pre-certification testing and advice
- Component procurement advice

RF PROTOCOL RANGE · TO 8 GHZ

Our areas of experience and expertise are within RF protocol range to 8 GHz. This includes, but is not limited to, the following:

BeiDou · Bluetooth · DAB / DVB-T · ESN (Emergency Services Network) · GPS L1/L2/L5 · GLONASS · GALILEO · GSM · 2G · 3G · IoT · 4G/LTE · 5G / 5G RedCap · IRIDIUM · ISM · LoRa · NFC · RFID · Sigfox · Wi-Fi (to 5.8 GHz) · WLAN · Z-Wave · Zigbee

IN THE FIELD

Real-World Deployment

Our antenna and connectivity hardware is engineered for the field, not just the bench, and is deployed in mission-critical remote monitoring across the UK water industry and beyond.

REMOTE TELEMETRY MAST · UK WATER UTILITY

RIVER-LEVEL MONITORING UNIT · UK WATER UTILITY

IN-CHAMBER DATA LOGGER · UK WATER UTILITY

CAPABILITY

Why Bloomice?

From in-house far-field measurement to field-proven deployment: the full antenna and RF design capability, under one roof, since 2001.

In-house anechoic chamber

0.4–8 GHz far-field measurement, Soliani-lined, DAMS 6000/FSM positioner.

End-to-end

Concept, simulation, prototype, test, tooling and production, under one roof.

Embedded specialists

Etched, metal-formed, LDS and ceramic-patch antennas.

RF protocol breadth

GNSS, cellular (to 5G), LoRa, Sigfox, Wi-Fi, BLE, UWB and more, to 8 GHz.

Proven in the field

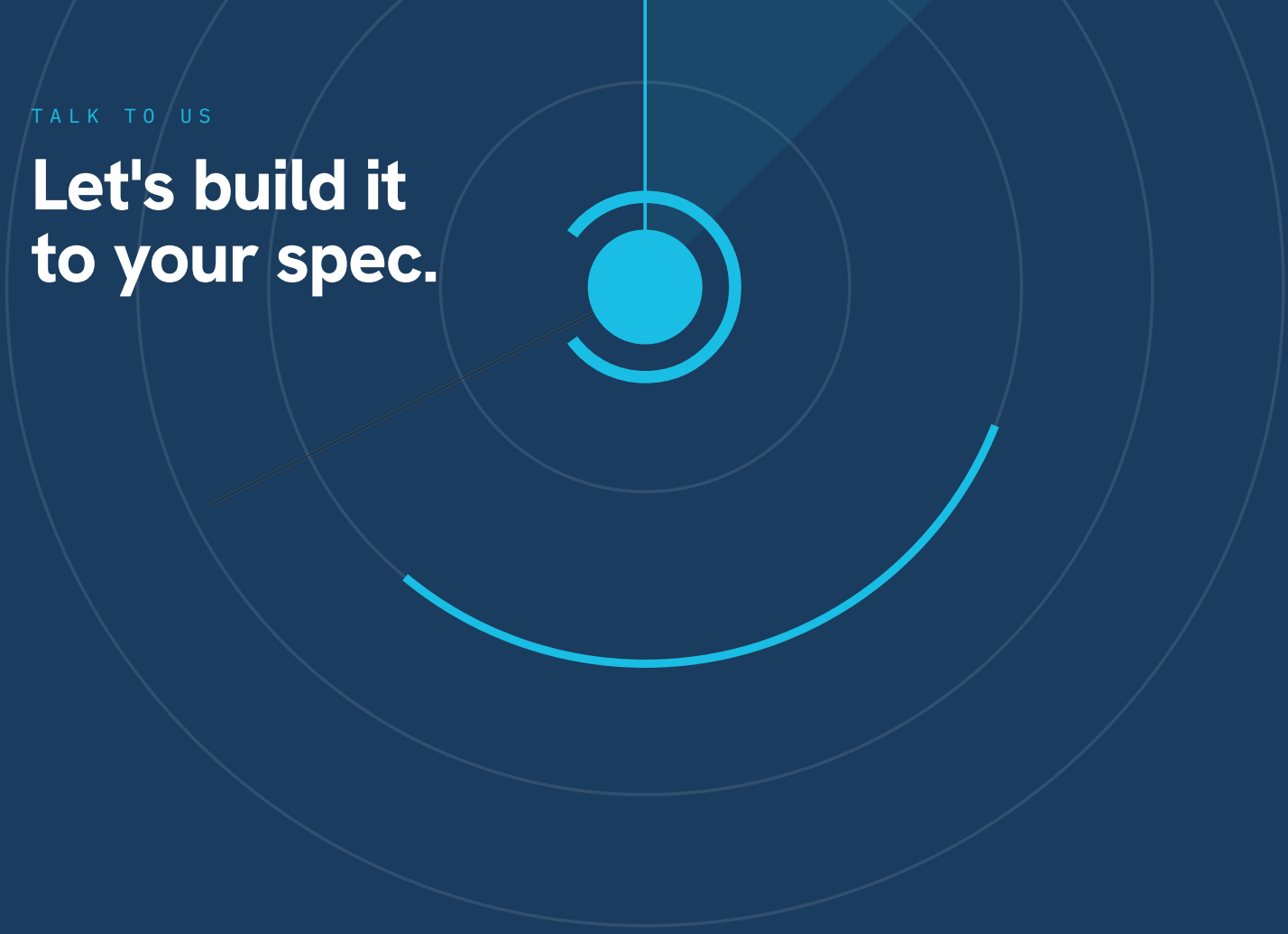
Mission-critical remote monitoring deployments.

Designing since 2001

Decades of bespoke antenna & cable engineering.

TALK TO US

Let's build it to your spec.



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