

RF & Microwave Housings in Aluminum and Brass

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This solution looks at how VT machining manufactures **RF/microwave housings, waveguide components and shielded enclosures** for the telecommunications sector, and how process and material choices combine to hit demanding requirements. It is written as a starting point for your own design discussion — every part is ultimately quoted and engineered to your drawing.

The natural first choice for this kind of component is [6061 Aluminum](#). 6061 machines cleanly, is light and plates/anodises well, making it the workhorse for RF housings that also need EMI performance after a conductive finish.

Why 6061 Aluminum?

6061 Aluminum is specified here because of how its properties match the duty of RF/microwave housings, waveguide components and shielded enclosures. We confirm the exact grade, temper or heat-treat condition with you before machining, and can supply material certificates for traceability. See our dedicated [CNC Milling 6061 Aluminum](#) capability page for process-and-grade detail.

Material Alternatives & Substitutions

Depending on cost, corrosion, strength or weight priorities, several alloys can substitute for 6061 Aluminum. Each links to its machining capability page:

Alternative	When to choose it
6063 Aluminum	better for extruded waveguide profiles and fine finishes
C360 Brass	free-machining brass for connectors and tuned cavities
C110 Copper	highest conductivity for low-loss RF surfaces
Kovar	controlled expansion for glass-to-metal sealed feedthroughs

Recommended Process Routes

For RF/microwave housings, waveguide components and shielded enclosures, the core shaping operations are usually:

- [CNC Milling](#) — primary shaping of the main geometry.
- [CNC 5-Axis Machining](#) — primary shaping of the main geometry.
- [CNC Turning](#) — primary shaping of the main geometry.

High-Tolerance Process Combination

Where the drawing calls for tight cavity dimensions for tuned frequency response, fine surface finish on waveguide walls and accurate connector interfaces, a single operation is rarely enough. We recommend combining processes in sequence so each stage refines the last:

1. [CNC Milling](#) — rough and semi-finish the part close to net shape, leaving controlled stock for finishing.
2. [CNC Wire EDM](#) — bring critical features to final size and geometry with a precision finishing pass.
3. [CNC Polishing](#) — produce the tightest features or hardened-material details that cannot be cut conventionally.
4. [CNC Deburring](#) — achieve the final surface finish, edge condition and cosmetic quality.

Sequencing the work this way isolates roughing distortion from the finishing stages, which is how tight tolerances are held repeatably in production. We plan the exact route from your tolerance scheme and first-article results.

Feature & Secondary Operations

Additional features and finishing are added with:

- [CNC Drilling](#)
- [CNC Tapping](#)
- [CNC Engraving](#)
- [Chemical Etching](#)

Related Applications

This solution supports the following application areas — each shows the broader range of parts and materials we make for that industry:

- [Telecom & RF](#)
- [Electronics & Enclosures](#)

Standards & References

Relevant standards for this kind of work include IPC standards (electronics), MIL-DTL connectors. These are cited for guidance only; we work to the standards and revisions named on your drawing.

Authoritative public references used in preparing this overview:

- [Waveguide fundamentals](#)
- [Kovar controlled-expansion alloy](#)

Frequently Asked Questions

What is the best material for RF/microwave housings, waveguide components and shielded enclosures?

6061 Aluminum is the usual first choice because 6061 machines cleanly, is light and plates/anodises well, making it the workhorse for RF housings that also need EMI performance after a conductive finish. Alternatives such as 6063 Aluminum, C360 Brass, C110 Copper are used when cost, corrosion or weight priorities differ.

Which processes hold the tightest tolerances for RF/microwave housings, waveguide components and shielded enclosures? We combine processes in sequence — typically CNC Milling, CNC Wire EDM, CNC Polishing, CNC Deburring — so roughing distortion is separated from finishing and the critical features are produced last.

Can you machine 6061 Aluminum to my drawing?

Yes. Send your CAD or 2D drawing, the grade and condition, the quantity and any finish or inspection requirements, and our engineers will confirm feasibility, pricing and lead time — usually within one business day.

What quality documentation can you provide?

Material certificates, dimensional inspection reports and first-article documentation are available on request, aligned to the standards named on your drawing.

Need RF/microwave housings, waveguide components and shielded enclosures manufactured to your spec? Send your drawing and quantity for a fast quotation.

[Request a Quote](#)