HIRONIC

Non-Invasive Body Contouring
Based on 2.45GHz Microwave Energy

Beyond Fat Reduction: Microwave Technology for Predictable Body Contouring

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01

CHAPTER 01

What is Microwave Energy?

Mechanisms and effects of 2.45GHz microwave energy on subcutaneous fat

WHAT IS MICROWAVE ENERGY?

The physics behind 2.45GHz microwave energy

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Magnetron Source

A magnetron — the same vacuum-tube oscillator used in household microwave ovens — generates 2.45 GHz microwave energy.

02

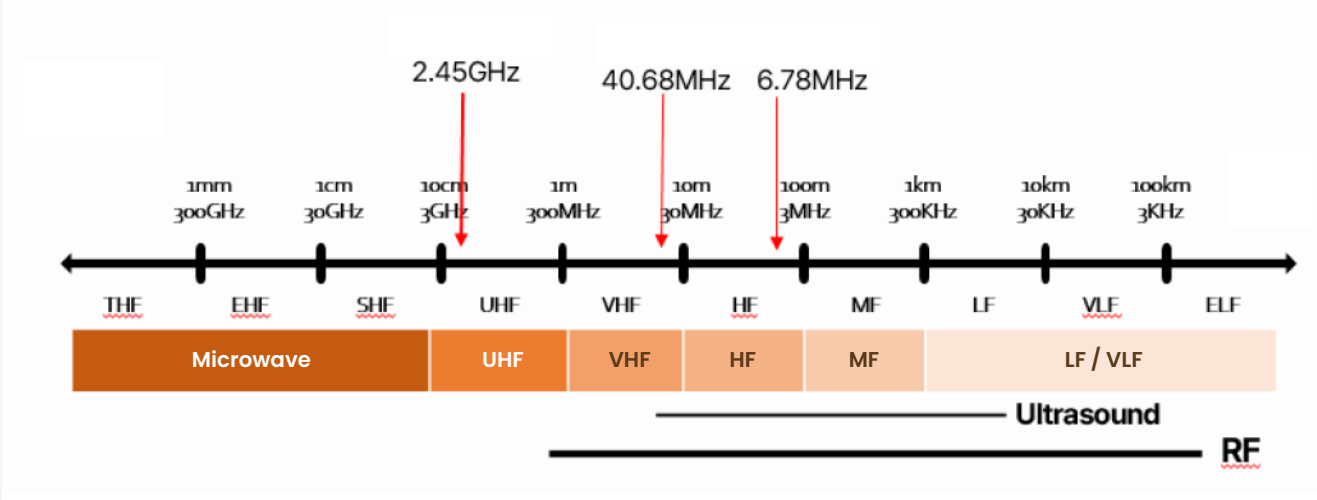
Tissue Absorption

The electromagnetic energy is absorbed by tissue rather than conducted through electrodes.

03

Dielectric Heating

Deep tissue heating via the dielectric effect: interaction with polar molecules (water and fat) causes vibration and frictional heat generation.

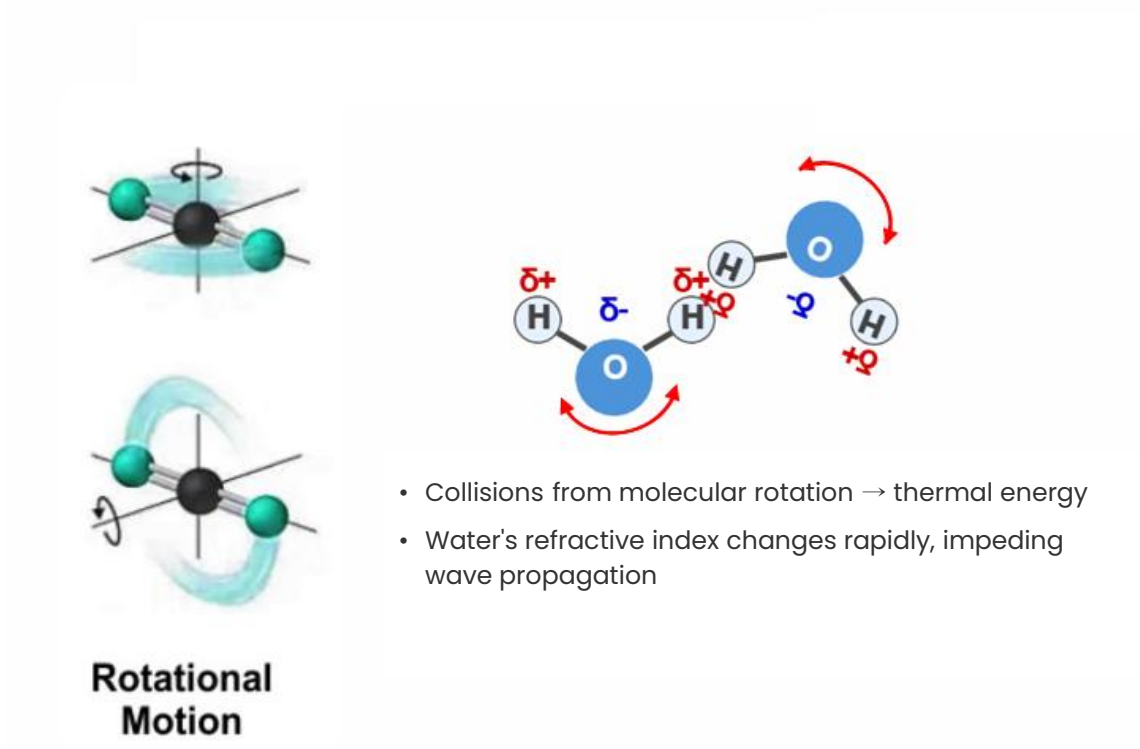


ELECTROMAGNETIC SPECTRUM

- The microwave band spans 300 MHz – 300 GHz.
- 2.45 GHz is selected for its physical properties and penetration depth — it affects only water-molecule motion.
- Energy is therefore absorbed preferentially where water content is high.

WHAT IS MICROWAVE ENERGY?

Dielectric heating — how 2.45GHz turns molecular motion into heat



- Collisions from molecular rotation → thermal energy
- Water's refractive index changes rapidly, impeding wave propagation

Rotational motion of polar water molecules under an alternating 2.45GHz field

CHARACTERISTICS OF 2.45 GHZ — VIBRATIONAL HEATING OF WATER MOLECULES

Molecular collisions

Collisions driven by molecular rotation are converted directly into thermal energy inside the tissue.

Wave attenuation in water

The refractive index of water changes rapidly at this frequency, impeding further wave propagation — energy is deposited, not transmitted.

Water-selective heating

Because only water-molecule motion is affected, heating is concentrated in water-rich tissue layers.

MECHANISM OF FAT REDUCTION

Four-step cascade from heat delivery to natural elimination

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STEP 01

Heat Delivery

Heat is delivered to the subcutaneous fat layer

STEP 02

Adipocyte Stress

Thermal stress accumulates in adipocytes

STEP 03

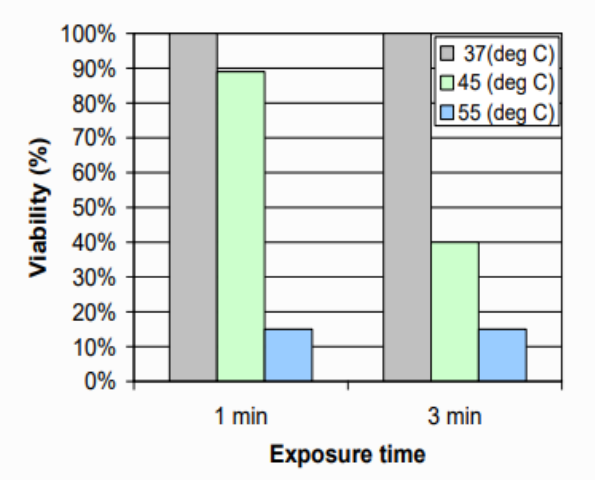
Fat Cell Breakdown

Blood flow increases and fat cells break down

STEP 04

Elimination

Debris is cleared through the lymphatic system

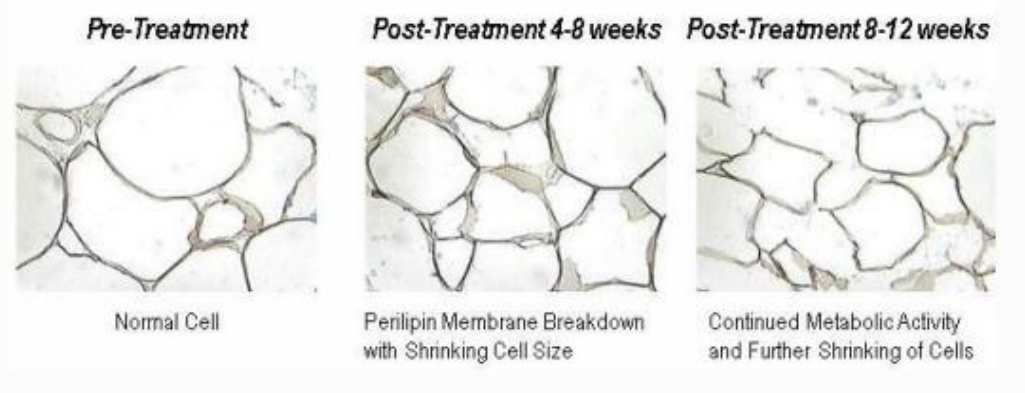


Fat-cell viability vs. exposure time (37 / 45 / 55 °C)

40%

fat-cell survival after 3 minutes of exposure at 45 °C

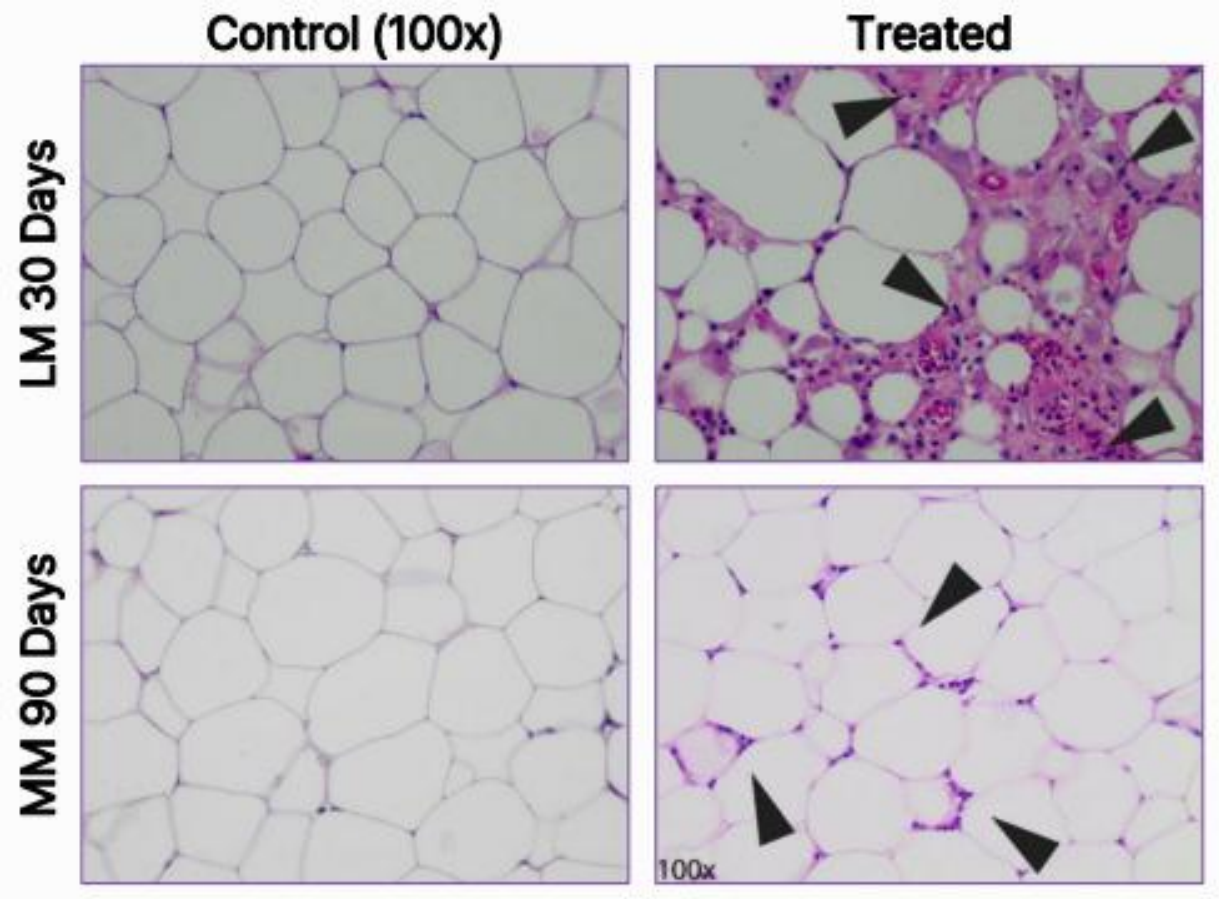
Reach ~45 °C quickly, then simply hold the temperature — high efficacy with less heat and shorter time.



No irreversible damage to the skin. Energy required to burn 1 g of fat ≈ 37,000 J — heat is deposited where it counts: the subcutaneous fat layer.

MECHANISM OF FAT REDUCTION

Histological evidence — H&E staining, treated vs. control (100×)



H&E STAIN TIMELINE

Day 30

Inflammatory response and adipocyte death reach their peak (arrowheads: damaged fat cells).

Day 90

Inflammation has resolved and no further adipocyte death is observed — a clean, self-limited process.

WHY IT IS SELECTIVE — SKIN VS FAT

Dielectric properties make 2.45GHz microwave inherently fat-selective

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SKIN

Permittivity ↓

Absorbs very little energy — the epidermis and dermis are largely transparent to the field.

Conductivity ↑

Microwaves pass through the skin and penetrate into deeper layers.

FAT

Permittivity ↑

Fat can store a large amount of energy — the field is absorbed here.

Conductivity ↓

Energy cannot penetrate further — it stops in the fat layer, sparing muscle.

Effective for fat & cellulite while remaining safe for the skin

SUMMARY — MICROWAVE ENERGY

What 2.45GHz microwave does, in four points

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Selective subcutaneous heating

Microwave (2.45 GHz) energy selectively heats the subcutaneous fat layer to 38–45 °C, weakening fat cells without damaging the skin.

02

Higher lipolysis efficiency

Dielectric heating by electromagnetic waves increases fat-cell membrane permeability and raises the efficiency of lipolysis.

03

Lymphatic & metabolic activation

Promotes lymphatic circulation and metabolism; water-molecule vibration inside adipocytes induces micro-thermal damage.

04

Progressive, natural reduction

The result is a progressive reduction in fat-cell size and activation of lipolysis.

THE KEY MESSAGE

Microwave is the only device whose primary target is the fat layer.

HIFU targets the SMAS. RF targets the dermis.
Microwave targets fat — by physics, not by settings.

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CHAPTER 02

What is Different about MIGLOU?

FIM matching technology, gyro-sensor safety, and EMF shielding

FIM MATCHING TECHNIQUE

Focused Intensive Microwave — patented energy-concentrating architecture

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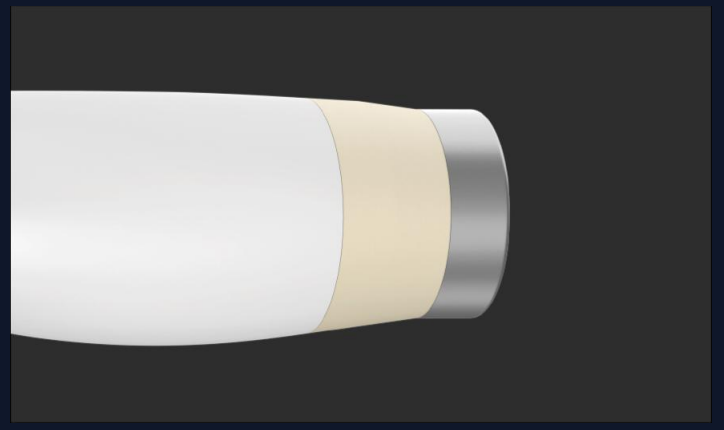
- Rather than simply emitting energy, the Horn structure (an energy-concentrating design) reduces electromagnetic dispersion and focuses the direction of electric-field formation.
- A multi-layer "Complex matching" structure, tuned to the properties of each skin layer, minimizes energy loss and reflection — heat is concentrated efficiently only at the intended depth.

Focused Intensive Microwave

Horn structure + multi-layer matching — a patented combination unique to MIGLOU.

NORMAL

Conventional emission — vertical delivery with wider dispersion



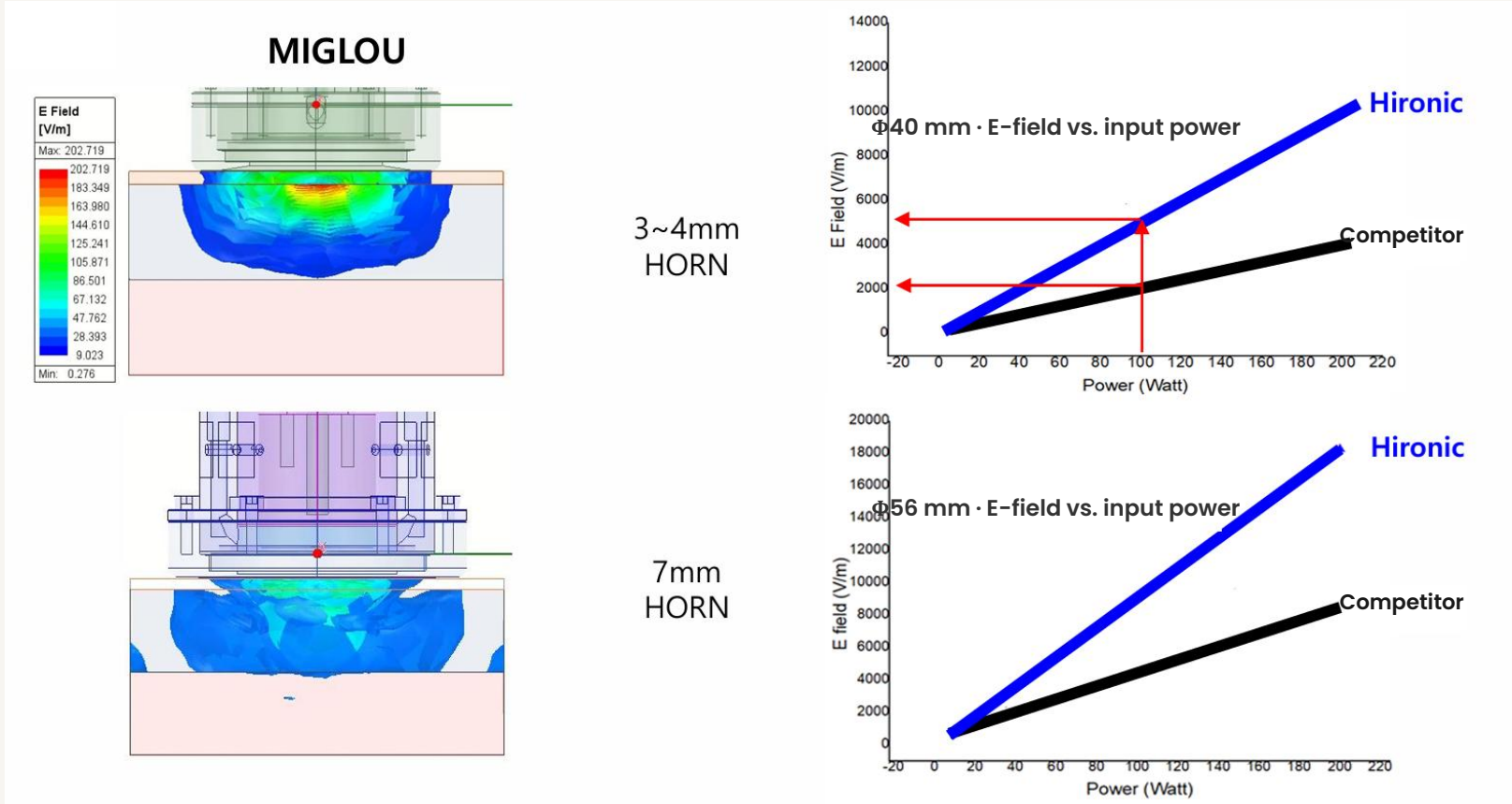
MIGLOU™

FIM emission — field concentrated toward the target depth

▶ Where conventional devices focused on "vertical delivery" of the field, FIM concentrates energy through the HORN + multi-layer matching structure — raising delivery efficiency.

FIM MATCHING TECHNIQUE

E-field simulation — MIGLOU vs. conventional, by handpiece and input power



Left: E-field distribution (3–4 mm and 7 mm horns). Right: E-field intensity vs. input power — Φ40 mm and Φ56 mm apertures.

HOW TO READ IT

Hironic (MIGLOU) — steeper curve: stronger field per watt of input

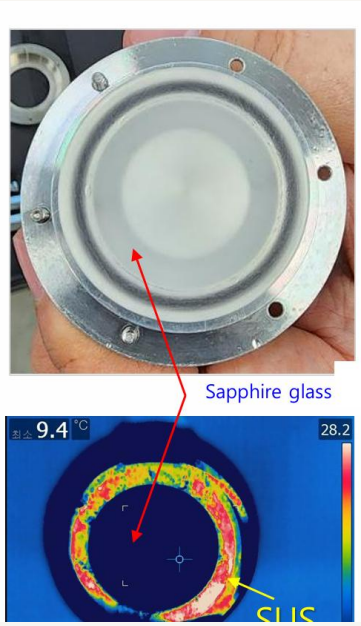
Competitor — flatter curve: weaker E-field at the same input power

Faster heat-up, shorter treatment time — or more energy in the same time.

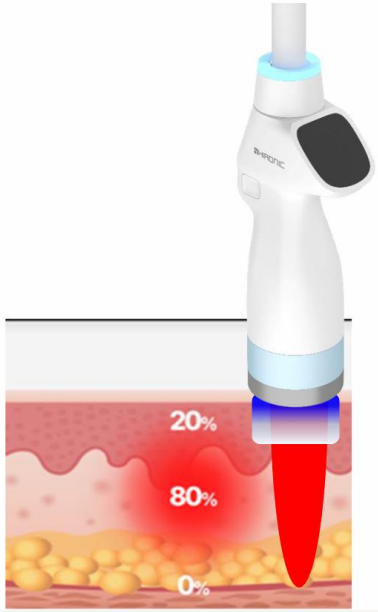
GYRO SENSOR

Cooling plus motion sensing — burn prevention by design

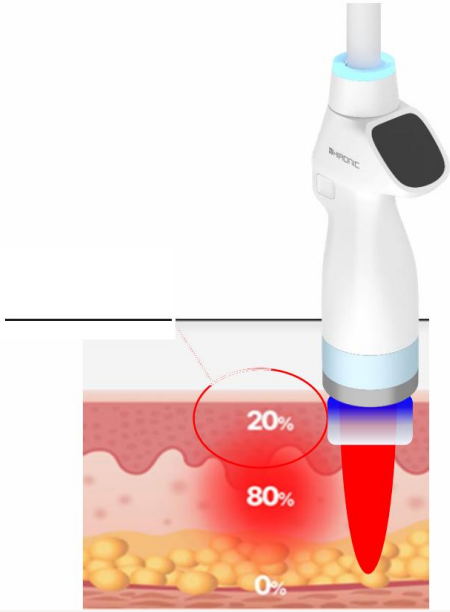
- The skin-contact surface is actively cooled, preventing thermal burns from microwave energy absorbed in the dermis (sapphire-glass window with circulating cooling water).
- MIGLOU's gyro sensor verifies both Contact AND Moving before output — competitors check contact only, so continuous output at the same spot can cause burns.



Cooling assembly & thermal image



Contact & Moving check — MIGLOU



Contact-only check — competitors

MIGLOU — output only while Contact & Moving are both confirmed

Competitors — contact-only check: continuous delivery at the same spot risks burns (red circle)

OPERATOR SAFETY — EMF SHIELDING

Antenna characteristics measured by the IoT Technology Support Center, 2025.08.12

- Output energy in directions other than the Z-axis (treatment direction) is negligible — around -40 dB.
- Compared with competitor products, stray electromagnetic emission is 6–10 dB lower (a factor of 4–10×).

MEASUREMENT	COMPETITOR HORN	HIRONIC HORN (MIGLOU)	NOTE
Average gain (dBi)	-26.6 dBi	**-33.2 dBi**	Hironic horn radiates ≈ 4× less
Radiated power @ 100 W	0.22 W	**0.05 W**	Household Wi-Fi router ≈ 0.1 W in air
Radiated power @ 200 W	0.44 W	**0.10 W**	At or below Wi-Fi-level exposure
Operator safety	Higher stray emission	**Lower stray emission**	Judged safer: less off-axis output into the air

▶ The treatment environment stays comfortably safe for the operator — stray emission is at the level of everyday household electronics.

TREATMENT PROTOCOL — FACE & BODY

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Recommended operating parameters by treatment area and horn depth · REV 1 [05/2026]

FACE (3MM)		
Power	80W	110W
Energy	60,000J	80,000J
Time	12 – 13 min	

FACE (7MM)		
Power	90W	120W
Energy	60,000J	80,000J
Time	11 – 12 min	

Interval: every 4 weeks · 3–5 sessions · Depth selection: 7 mm for thicker subcutaneous fat, 3 mm for areas with minimal fat (under the chin, perioral area)

BODY (7MM)	Arms	Thighs	Trochanter	Back	Abdomen & Flanks
Power	90 – 120W	100 – 130W	100 – 130W	100 – 130W	110 – 130W
Energy	50,000 – 60,000J	50,000 – 70,000J	50,000 – 70,000J	50,000 – 70,000J	90,000 – 140,000J
Time	8 – 10 min	8 – 9 min	8 – 9 min	8 – 9 min	13 – 18 min

BODY (12MM)	Arms	Thighs	Trochanter	Back	Abdomen & Flanks
Power	110 – 140W	120 – 140W	120 – 140W	120 – 140W	110 – 150W
Energy	80,000 – 90,000J	60,000 – 90,000J	70,000 – 100,000J	70,000 – 90,000J	140,000 – 180,000J
Time	9 – 10 min	9 – 12 min	8 – 12 min	8 – 12 min	16 – 20 min

Interval: every 4 weeks · 3–5 sessions · Divide the treatment area into sub-areas; for localized fat, measure skinfold inside the square sub-area with the patient standing

▶ Time is required for metabolic processing and lymphatic clearance following fat disruption — gradual remodeling and lifting require consistent, repeated sessions.

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CHAPTER 03

What Our Users Says About MIGLOU

A heavy user's verdict after long-term hands-on demos of competing platforms

WHAT OUR USERS SAYS ABOUT MIGLOU

Three reasons, from daily clinical experience

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01

Hironic's Technology

DOUBLO started Korean-made HIFU; NEW DOUBLO 2.0 (V-RO in Korea) was the world's first simultaneous HIFU + bipolar-RF device. It has been our clinic's #1 re-booked lifting laser in 2024–2025. Now, we have MIGLOU.

02

Patented FIM Technology

After a 3-month demo of MIGLOU showed a visible difference in reducing fat volume, compared to other devices — especially on the body.

03

Comfortable — for Both

The handpiece is far lighter than other devices' and the wire support genuinely helps. A colleague who used to operate a competing device all day calls MIGLOU "heaven". Easier for the practitioner, gentler for the patient.

MIGLOU could define HIRONIC's next 20 years. Experience it at least once.

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