The requirement for low cost, light weight, compact and portable medical systems has been a major obstacle in a number of companies developing treatments using microwaves as their energy modality of choice.

In the growing field of medical ablation procedures, the development of superior applicators can overshadow the microwave power generation development and result in the system development work being subcontracted at a huge cost to companies. To provide customers with a complete, fully functional and 60601 compliant solution, Emblation Microwave has developed the MSYS245 microwave generator.

This new model uses state of art technology to produce a highly efficient 2.45GHz microwave system capable of generating variable power in excess of 100W at 2.45GHz with superior reflection measurement capability and temperature stability.
**APPLICATIONS**

The 60601 compliant microwave generator is ideal for hyperthermia and coagulation/ablation based procedures requiring low to moderate microwave power at 2.45GHz.

The compact and light weight design allows the system to be easily used in any clinical or office setting without any portability or storage constraints.

**HIGH OUTPUT POWER**

The microwave generator uses GaN on SiC solid-state technology operating in class A/B mode to generate microwave power in excess of 100W CW using an internally regulated microwave source - see Fig. 1.

The output power can be varied in 5W increments from 0-100W using pulse width modulation (PWM) techniques with power stability maintained well within 5% of the set value.

**ADVANCED REFLECTION MEASUREMENT SYSTEM**

The MSYS245 has, as standard, an innovative reflected power measurement mode of operation.

When used in the [swept] mode, the system has the capability to reduce the reflection measurement error significantly for applicators with a return loss of less than 12dB to ensure that the accurate measurement of reflection is relayed to the user. This measurement technique also allows the medical system to be less affected by manufacturing tolerances in the applicators and tethered RF cables.

This mode of operation is particularly useful for applications that are dependent on the accuracy of reflected signal to identify tissue property changes or relaying treatment progress and safety to the user.

**SUPERIOR COOLING**

The use of higher operating voltages on the GaN on SiC semiconductors in the MSYS245 system design helps reduce the drain current and the resultant Joule effect losses.

The system has an amplifier efficiency of ~62% resulting in a low channel temperature rise and also significantly reduced thermal loss requiring reduced thermal management – see Fig 2. The MSYS245’s highly efficient design has allowed the implementation of a novel, thermal cooler solution to dissipate heat losses and maintaining the amplifier temperature when operating at full power at below 55 degrees Celsius.

The cooling system employed is very compact with superior thermal capacity per unit volume allowing the overall system to be significantly smaller and lighter with an optimised air-flow management system.

**ACCESSORIES**

The system is supplied, as standard, with a regional specific mains lead and medical grade footswitch.
SIMPLE USER INTERFACE

The user interface for the MSYS245 has been ergonomically designed for ease of use, with an intuitive interface having all controls in full view for the user.

[SWEPT] – this mode allows an improved accuracy measurement of real-time reflected power to be made and displayed for procedures where applicators have non-optimal microwave characteristics.

[RESET] – Resets the system back to the initial power-on values. When the footswitch is pressed and the microwave energy is enabled, the system displays the real-time measurement of both the output and reflected power.

Timer Set – The time can be set up to a maximum of 99 minutes. When the microwave power is enabled via an external footswitch, the timer function will decrement in 1 second steps and disable the microwave power when the timer reaches zero.

All information is displayed on a high contrast white LED display during set mode.

Warning LED’s and audible alarms are included in the MSYS245 as standard.

The MSYS245’s fascia, LED display and badge are fully customisable to reflect your brand.

Microwave power is enabled using the medical grade footswitch connected at the rear panel.
<table>
<thead>
<tr>
<th>Performance Summary</th>
<th>MSYS245</th>
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<tbody>
<tr>
<td>Saturated output gain</td>
<td>52-54dBm typical</td>
</tr>
<tr>
<td>Saturated output power</td>
<td>50-51dBm typical</td>
</tr>
<tr>
<td>Output impedance</td>
<td>50Ω nominal</td>
</tr>
<tr>
<td>Amplifier efficiency</td>
<td>&gt;62%</td>
</tr>
<tr>
<td>Switching time</td>
<td>10μs</td>
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<tr>
<td>Operating voltage</td>
<td>38Vdc</td>
</tr>
<tr>
<td>Quiescent current</td>
<td>&lt;2A</td>
</tr>
</tbody>
</table>

**Protection Interlocks**

| Amplifier interlock temperature | 65degC |
| VSWR | ∞ |

**Power Supply**

| Voltage supply | 100-240Vac 50-60Hz |

**Dimensions**

| Width x Height x Depth | 300 x 85 x 275mm (11.8 x 3.3 x 10.8 inch) |

*Table 1  MSYS245 Product Summary*