

## SOLUTION OVERVIEW

Microwave Ablation is a minimally invasive treatment for nonresectable liver, lung, and kidney tumors and other oncology procedures. Typical frequency is 2,450-MHz with power levels up to 150-W per channel. Microwave systems typically have 1-3 microwave power amplifiers. There may be a separate AC-DC power supply requirement for logic circuit board, display, and auxiliary power.

Advanced Energy has a long history supporting microwave solutions for medical applications. Advanced Energy's CoolX®1800 series, part of our Excelsys product line, is an intelligent modular power supply that has been a good fit for a number of microwave solutions.

The CoolX1800 delivers an incredible 1800 W in a compact 1U high package with PMBus™ digital communications, control, and reliability in addition to the most comprehensive feature set and specifications available.

In addition, Artesyn LCM Series and  $\mu$ MP Series as well as SL Power NGB Series have been leverage in Microwave Design Opportunities. With our broad range of medically certified power supplies, we are sure to have a solution to meet Electrosurgical power needs.



CoolX1800 Series

### Target Markets/Customers

Medical Device companies focused on electrosurgery for liver, lung, and kidney ablation. The following medical device companies have microwave ablation systems in the market or in development. There are many other medical device companies and start-ups investing in microwave systems not included in this list.

- AngioDynamics
- Canyon Medical
- Creo Medical
- Endowave
- Johnson & Johnson Ethicon
- Medtronic
- Surgnova
- Varian

### Where to Avoid

For low volume accounts, focus on standard products versus custom solutions.

### Audience – who to engage and when

- Focus on OEMs and ODMs of electrosurgery medical devices
- Roles: R&D Director, Engineering Manager, Principle Electrical Design Engineer, Sourcing Manager
- Functions: Product (line) management, Engineering, Technical Purchasing
- Seniority levels: Director, Manager
- When to engage: When prospects are in early design stages (++) or have completed their designs (+) and start to look for the required components. We then can position

our products and also our organizational capabilities as solutions to their problems

### Business Benefits

Quickly go to market with power platforms that keep you ahead of the curve

- Proven and highly reliable medical power supply solutions
- Broadest medical power portfolio
- Highest performance and unsurpassed quality
- Best in class Quality Management System
- Dedicated medical engineering and customer support
- Standard off the shelf and full custom solutions
- Regulatory expertise with deep system safety knowledge

*Armed with compliance expertise, we're your partner in your drive for optimal performance and lowest cost of ownership for your system design.*

# ELECTROSURGERY: MICROWAVE

INTERNAL CONTACTS


**Todd Huston**

Director, Strategic Marketing · Electrosurgery  
todd.huston@aei.com

## Qualifying Questions

- What is the application? For ODMs, who is the end customer?
- What input and output Voltages?
- What is the output power?
- How much is the peak load and duration?
- Dimension constraint?
- Leakage current?
- Convection or forced-air cooling?
- Auxiliary voltage requirement?
- Value-add opportunities—cabling, enclosure?
- Can the customer provide or discuss block diagram to uncover cross sell opportunities?



## Customer Challenges

- Reliability, efficiency and cost competitiveness
- Long lead times and lack of customer support delay time to market

## Generator Considerations

- Output Frequency (Up to 2,450-MHz )
- Voltage range (Up to 200 V)
- Power (Up to 150 W per microwave amplifier)



## Key Features & Specs (high-level differentiators)

### Advanced Energy's Artesyn $\mu$ MP series GEN II

- PMBus monitor/control of input functions
- 85 to 264 VAC input voltage range
- Full medical EN60601 approval

### Advanced Energy's SL Power NGB and NCF series

- EN61000-3-2 standards.
- Type BF (NGB Series) & Type CF (NCF Series)]

### Advanced Energy's Excelsys CoolX®1800 series

- 1800 W modular power supply in
- Compact 1U package

- Analog and digital management — PMBus™ monitoring and control capability
- IEC60601-1 (third edition) and the IEC60601-1-2 (fourth edition, EMC) standards for medical applications
- Type BF

### Advanced Energy's Artesyn LCM series

- Digital DSP control
- 300 to 3000 W Range
- IEC60601-1 (third edition) and the IEC60601-1-2 (fourth edition, EMC)

# ELECTROSURGERY: MICROWAVE

## COMPETITIVE ANALYSIS

Competitor Type	Their Positioning & Selling Points	Our Differentiation	Comparative Positioning
Delta	<ul style="list-style-type: none"><li>High volume / low price</li><li>Sell direct</li><li>They claim to be energy-saving solutions provider with core competencies in power electronics and automation, Delta's business categories include Power Electronics, Automation, and Infrastructure</li></ul>	<ul style="list-style-type: none"><li>Dedicated engineering teams (BU) to support our medical customer</li><li>Modified and custom solutions also for lower volumes.</li><li>AE has a highly skilled distributor network and serve low and medium volume customers</li><li>Our Customer Experience Centers (CECs) are your one-stop shop for all your design and testing needs. From pinpointing issues and prototype sampling to pre-compliance testing for entire systems, our engineers can help you meet deadlines and budgets.</li></ul>	<ul style="list-style-type: none"><li>AE is well established as a high reliability technology leading manufacturer of AC-DC (and LV and HV DC-DC) power supplies used in medical devices</li><li>AE is offering a very broad power product portfolio (AC-DC, LV AND HV DC-DC) which is leveraged for the end-customers by our distributors' accompanying product portfolio</li><li>AE offers deep expert knowledge in the medical sub-markets, coupled with expert local Sales and FAE supported though our global footprint.</li></ul>
XP Power	<ul style="list-style-type: none"><li>They claim to be a leading solutions provider for medical devices and healthcare equipment</li><li>Broad range of standard products</li></ul>	<ul style="list-style-type: none"><li>AE is dedicated to the design, development and support of medically certified solutions for medical applications</li><li>AE is a leader in developing HV DC-DC specifically for medical applications</li><li>We have multiple design locations in North America, EMEA and APAC.</li><li>Our Customer Experience Centers (CECs) are your one-stop shop for all your design and testing needs. From pinpointing issues and prototype sampling to pre-compliance testing for entire systems, our engineers can help you meet deadlines and budgets.</li></ul>	<ul style="list-style-type: none"><li>AE offers a very broad portfolio and ensures supply continuity &amp; strong disaster recovery capabilities</li><li>AE offers deep expert knowledge in the medical sub-markets, coupled with expert regional sales and FAE support globally</li><li>AE continues to invest in dedicated engineering teams to design medically certified products</li></ul>



# ELECTROSURGERY: MICROWAVE

## COMPETITIVE ANALYSIS

Competitor Type	Their Positioning & Selling Points	Our Differentiation	Comparative Positioning
TDK Lambda	<ul style="list-style-type: none"><li>■ Broad standard offering (AD-DC, LV DC-DC</li><li>■ TDK-Lambda is the only one with a full-function setup embracing everything from development and manufacture to sales and maintenance</li><li>■ Very open to customization</li></ul>	<ul style="list-style-type: none"><li>■ AE is the only major power supply company with a dedicated medical BU – with the broadest medical power supply portfolio</li><li>■ AE track record on medical applications (not only BF but also CF where needed) coupled with our investment in dedicated engineering teams to support customers.</li><li>■ Use of highly skilled, knowledgeable FAEs in combination with dedicated engineering teams to support customers further with the ability for modified products AND customized products.</li><li>■ Our Customer Experience Centers (CECs) are your one-stop shop for all your design and testing needs. From pinpointing issues and prototype sampling to pre-compliance testing for entire systems, our engineers can help you meet deadlines and budgets.</li></ul>	<ul style="list-style-type: none"><li>■ AE is offering an even broader power product portfolio (AC-DC, LV AND HV DC-DC) combined with deep expert knowledge in the medical sub-markets, coupled with expert local Sales and FAE supported though our global footprint</li><li>■ AE is well established as a high reliability technology leading manufacturer of AC-DC (as well as LV and HV DC-DC) power supplies used for system power in Medical Imaging systems</li><li>■ AE offers deep expert knowledge in the medical sub-markets, coupled with expert local Sales and FAE supported though our global footprint</li></ul>



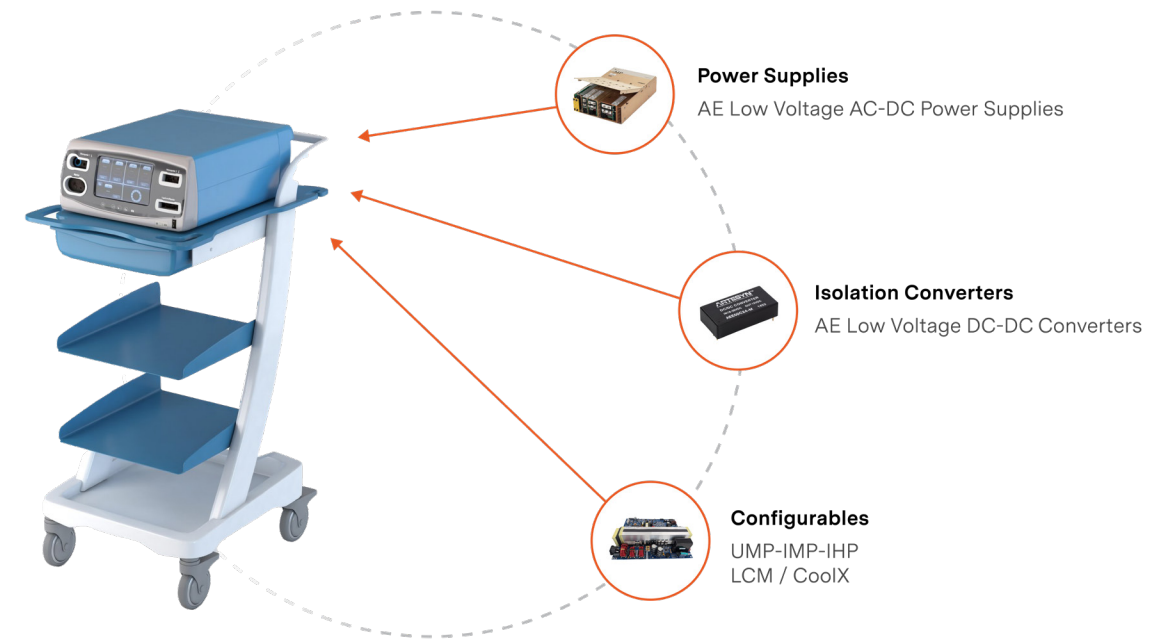
# ELECTROSURGERY: MICROWAVE

## ADDITIONAL REFERENCES

### Cross-Selling Opportunities

#### AC-DC power supplies

- Artesyn
  - LCM Series
  - $\mu$ MP series GEN II
  - NLP Series
  - ATA series
- Excelsys
  - CoolX Series
  - CS1000
  - UltiMod Series Gen II
- SL Power
  - NGB Series (BF Rated)
  - NCF Series (CF Rated)



LCM Series



$\mu$ MP series GEN II



CoolX1800 Series



NGB660




# ELECTROSURGERY: MICROWAVE

## ADDITIONAL REFERENCES

### EXCELSYS COOLX®1800

HIGH EFFICIENCY, INTELLIGENT AND RELIABLE 1800 W MODULAR POWER SUPPLIES



Advanced Energy's CoolX®1800 series, part of our Excelsys product line, is an intelligent modular power supply. The CoolX1800 delivers an incredible 1800 W in a compact 1U high package with PMBus™ digital communications, control and reliability in addition to the most comprehensive feature set and specifications available.

### PRODUCT HIGHLIGHTS

- Modular Power Supply
- Up to 1800 W
  - Up to 12 outputs
  - All outputs isolated (1850 VAC)
  - Variable fan speed control
- Reliability
- MTBF > 200,000 hours
  - Level 4 input surge protection
  - 23.5 W always ON auxiliary power output
  - Safety approved to 5000 m altitude
  - 91% efficiency
  - Five-year warranty
- Flexibility
- Analog and digital management — PMBus™ monitoring and control capability

- Field-configurable — plug and play power
- Series and parallel outputs for higher voltages and currents
- Mounting options — base/side and DIN-Rail mounting

### TYPICAL APPLICATIONS

- Medical
- Clinical diagnostic equipment, medical lasers, dialysis equipment, radiological imaging, clinical chemistry
- Industrial
- Test and measurement, industrial machines, automation equipment, printing, telecommunications, MIL-COTS
- Audio Equipment
- Hi Rel, harsh industrial electronics, radar (marine- and ground-based), communications, test and measurement

AT A GLANCE	
	CX18S CX18M
Power	1800 W 1800 W
Slots	6 6
Cooling	Variable fan speed control
Parameters	262 mm x 127 mm x 41 mm (10.5 in x 5 in x 1U)
Certification and Compliance	Medical (CX18M) <ul style="list-style-type: none"><li>■ IEC60601-1 3rd edition, IEC60601-1-2 4th edition (EMC)</li><li>■ 2 MOPP</li><li>■ Dual fused</li></ul>

## Product Datsheets References

- [Advanced Energy's Artesyn µMP series GEN II uMP Gen II Series | 1800 W Configurable AC-DC Power Supplies](#)
- [Advanced Energy's SL Power NGB and NCF series ENG-NGB800](#)
- [Advanced Energy's Excelsys CoolX series CoolX](#)
- [Artesyn LCM Series LCM Enclosed Power Supplies](#)

