

CLAIMS

1. An electrosurgical generator for generating radiofrequency (RF) electromagnetic (EM) energy and microwave
5 EM energy, the generator comprising:
a microwave source for generating a microwave signal;
a microwave channel for conveying the microwave signal from the microwave source to be output from the generator;
an RF channel for conveying an RF signal to be output
10 from the generator;
a microwave-to-RF converter connectable to receive the microwave signal, the microwave-to-RF converter being arranged to:
generate the RF signal from the microwave signal,
15 and
deliver the RF signal to the RF channel.
2. An electrosurgical generator according to claim 1, wherein the microwave-to-RF converter includes:
20 a RF switching unit arranged to introduce an RF characteristic into the microwave signal; and
a rectifying unit for rectifying the microwave signal while preserving the RF characteristic,
wherein the RF signal is obtained from an output of the
25 rectifying unit.
3. An electrosurgical generator according to claim 2, wherein the rectifying unit operates as full-wave rectifier for the microwave signal.
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4. An electrosurgical generator according to claim 2 or 3, wherein the RF characteristic comprises a principle RF component having a frequency of 400 kHz.
- 35 5. An electrosurgical generator according to any one of claims 2 to 4, wherein the RF switching unit comprises a

modulator for pulsing the microwave signal at a frequency less than 300 MHz.

5 6. An electrosurgical generator according to claim 5, wherein the modulator is arranged to operate at a duty cycle of 50%.

10 7. An electrosurgical generator according to claim 6, wherein the rectifying unit is arranged to output a square wave.

15 8. An electrosurgical generator according to any one of claims 2 to 4, wherein the rectifying unit comprises a first rectifier and a second rectifier, and wherein the RF switching unit is arranged to alternate the microwave signal between the first rectifier and the second rectifier at a frequency less than 300 MHz.

20 9. An electrosurgical generator according to claim 8, wherein the microwave-to-RF converter is arranged to form a composite rectified signal from rectified signals output from the first rectifier and the second rectifier.

25 10. An electrosurgical generator according to claim 9, wherein the composite rectified signal is a square wave.

30 11. An electrosurgical generator according to any one of claims 2 to 10, wherein the microwave-to-RF converter comprises a filtering unit arranged to remove unwanted frequency components from the output of the rectifying unit.

 12. An electrosurgical generator according to any one of claims 2 to 11, wherein the microwave-to-RF converter comprises a step-up transformer.

13. An electrosurgical generator according to any preceding claim including a switch for selectively directing the microwave signal to the microwave channel or the microwave-to-RF converter.

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14. An electrosurgical generator according to any preceding claim including a signal combiner for connecting the microwave channel and the RF channel to a common output channel.

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15. An electrosurgical generator according to any preceding claim including a controller arranged to operate the microwave-to-RF converter.

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16. An electrosurgical system for delivering radiofrequency (RF) electromagnetic (EM) energy and microwave EM energy into biological tissue, the system comprising:

an electrosurgical generator according to any preceding claim;

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a delivery probe connected to receive the microwave signal and RF signal from the electrosurgical generator.