Spectrum Control specializes in the design and manufacture of hybrid chip and wire amplifiers. Class A amplifiers differ significantly from their Class AB counterparts. In Class A designs, the devices are biased to conduct current throughout the entire input signal cycle. While this approach delivers exceptional spectral fidelity, it comes at the cost of efficiency, as the amplifier operates at a continuous 100% duty cycle. By contrast, Class AB amplifiers represent a middle ground between Class A and Class B operation. They are biased to conduct for more than half (180°) of the waveform, improving efficiency while reducing the distortion that is typical in pure Class B designs.

Performance	Class A Amplifier	Class AB Amplifier
Heat	Class A amplifiers generate more heat due to their constant DC power consumption and may require a copper bus to dissipate the excess thermal energy.	Class AB amplifiers produce less heat than typical CW Class A designs because their transistors are not continuously operating at 100%.
Power	Because Class A amplifiers are less efficient, they generally deliver lower power output compared to Class AB designs.	Class AB amplifiers typically achieve higher output 1 dB compression points due to their more efficient use of the DC supply.
Bias	A Class A amplifier conducts DC current throughout the full 360° of signal propagation. The transistors remain in an “always-on” state, even when no RF input signal is applied.	Class AB amplifiers conduct current for more than 180° of the signal cycle. Typical designs employ a push-pull configuration, in which one transistor conducts during the positive half of the waveform while the other transistor conducts during the negative half.
Efficiency	Class A amplifiers are inherently inefficient, with typical efficiencies ranging between 20% and 25%. This low efficiency is a direct result of their continuous-wave (CW) operation, which dissipates a large portion of the DC supply power as heat.	Class AB amplifiers are significantly more efficient than Class A designs, with typical efficiencies reaching up to 60%.
Fidelity	Class A amplifiers provide the lowest distortion and highest signal fidelity. Since the transistors operate in the linear region at all times, they avoid the “crossover distortion” that can result from clipping or switching transitions.	Class AB amplifiers deliver higher fidelity than pure Class B designs but fall short of the performance achieved by Class A amplifiers. A small overlap is introduced during the conduction phase between transistors, which effectively eliminates the crossover distortion that is characteristic of simple Class B amplifier designs.