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Class-A HF PA with RD16HHF1, designed by WA2EUJ

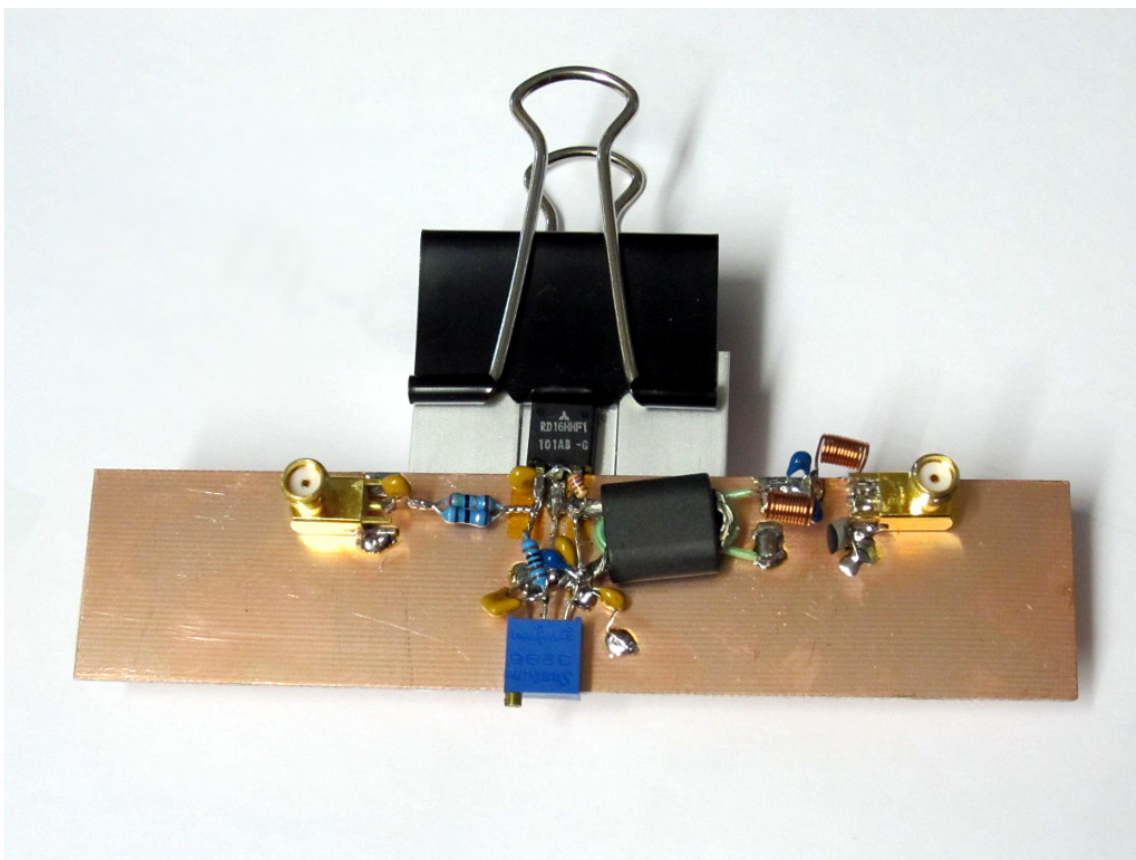
Claudio Girardi (IN3OTD)

2–3 minutes

Under construction...

Class-A HF PA designed by Jim Veatch, WA2EUJ proposed by AC9HY for using with the [Hermes-Lite SDR](#).

All measurement with $V_{dc}=12.5\text{ V}$ and $I_{ddQ}=500\text{ mA}$.

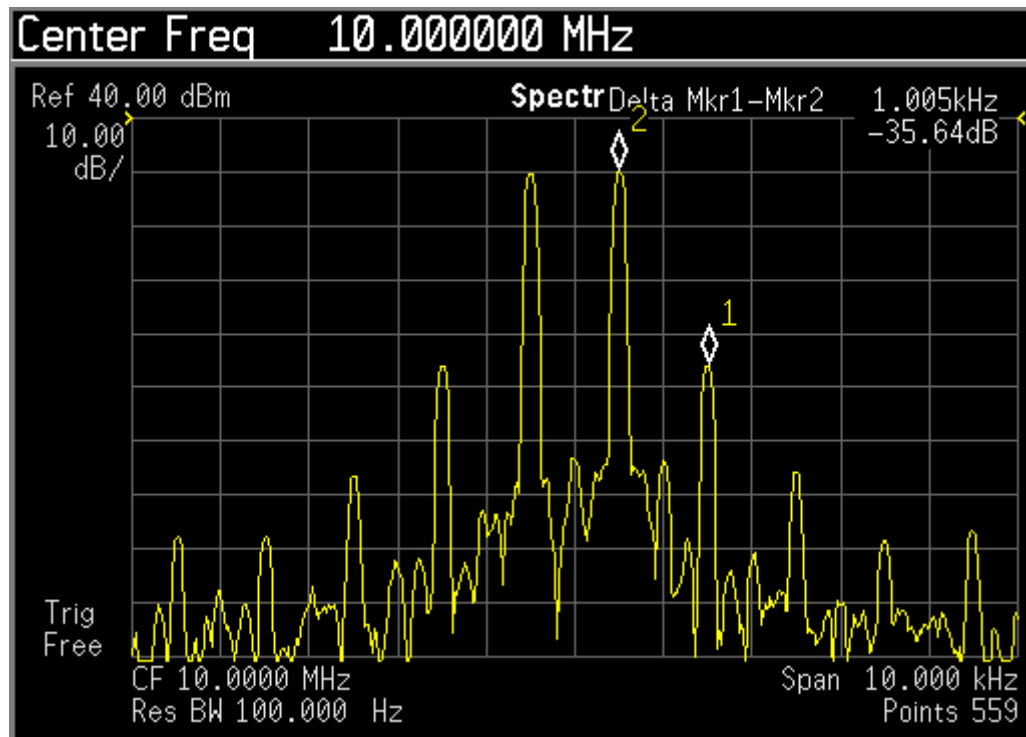


Output transformer is wound on a BN43-202 core; primary winding (drain side) is 1 turn with coaxial cable braid, secondary

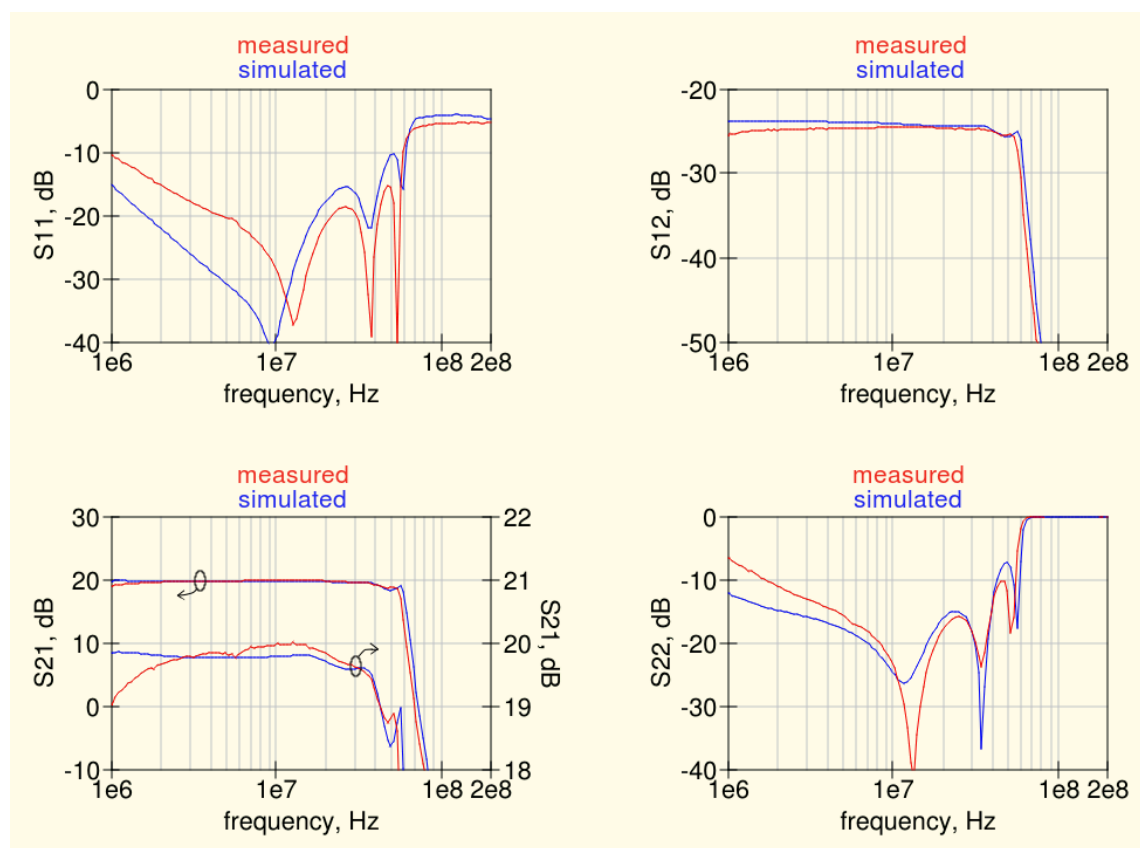
winding is 2 turns inside the coaxial braid, to maximize coupling and improve the high-frequency response.

The small heat sink is cooled by forced air to keep the device temperature sufficiently low.

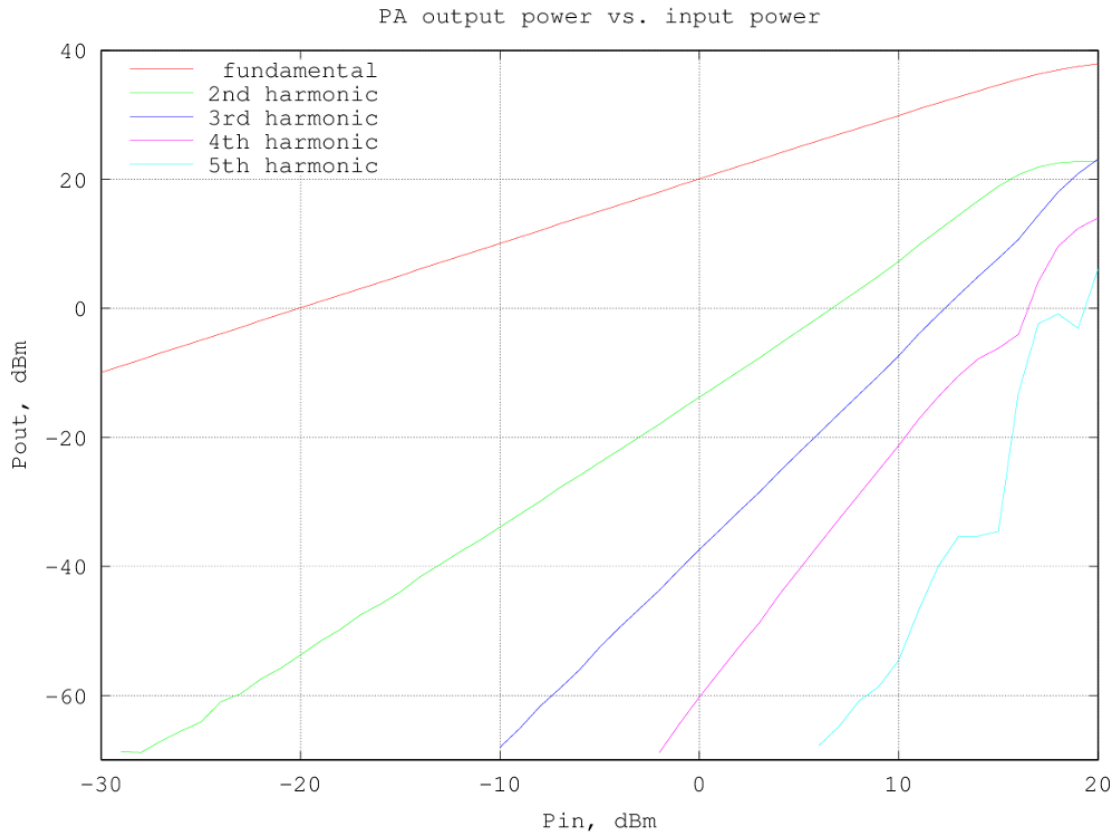
Intermodulation products at 4 W PEP output:



Measured small-signal S-parameters (with -10 dBm input):

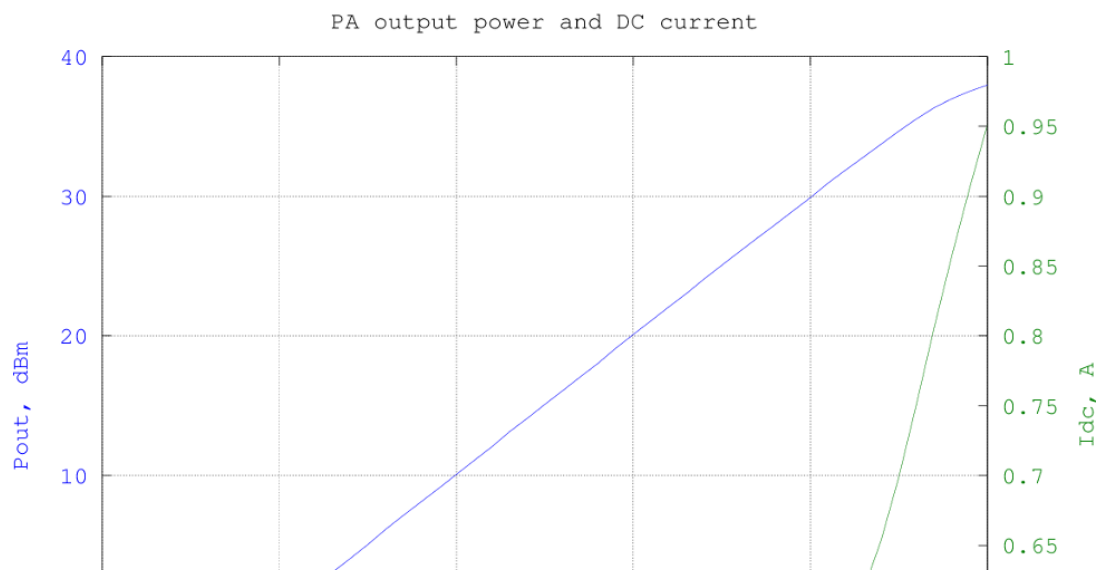


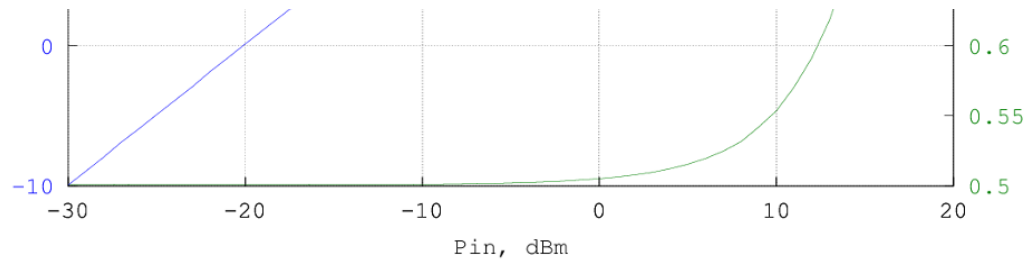
The fundamental and harmonics output levels versus input power, with a 10 MHz sinewave input, is shown in the graph below:



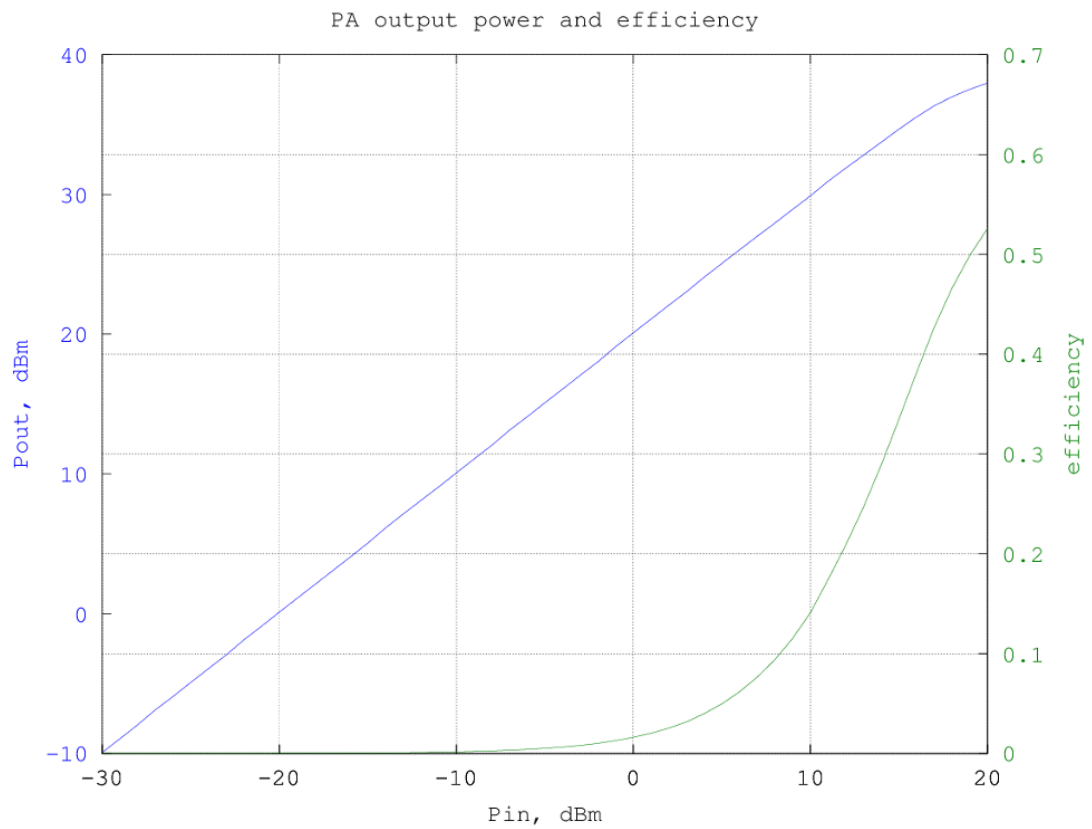
the output power at 1 dB of compression is about 4.8 W (36.8 dBm).

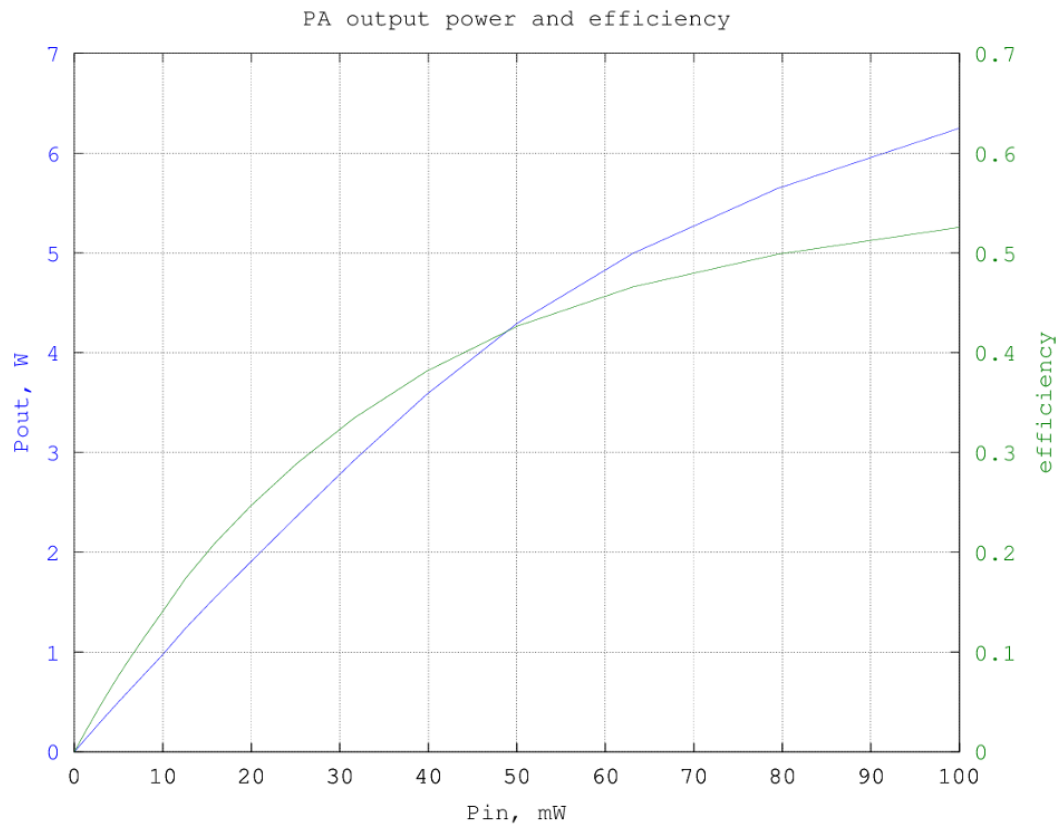
RF output and DC current drawn from the supply versus input power (10 MHz sinewave) are shown in the following graph:



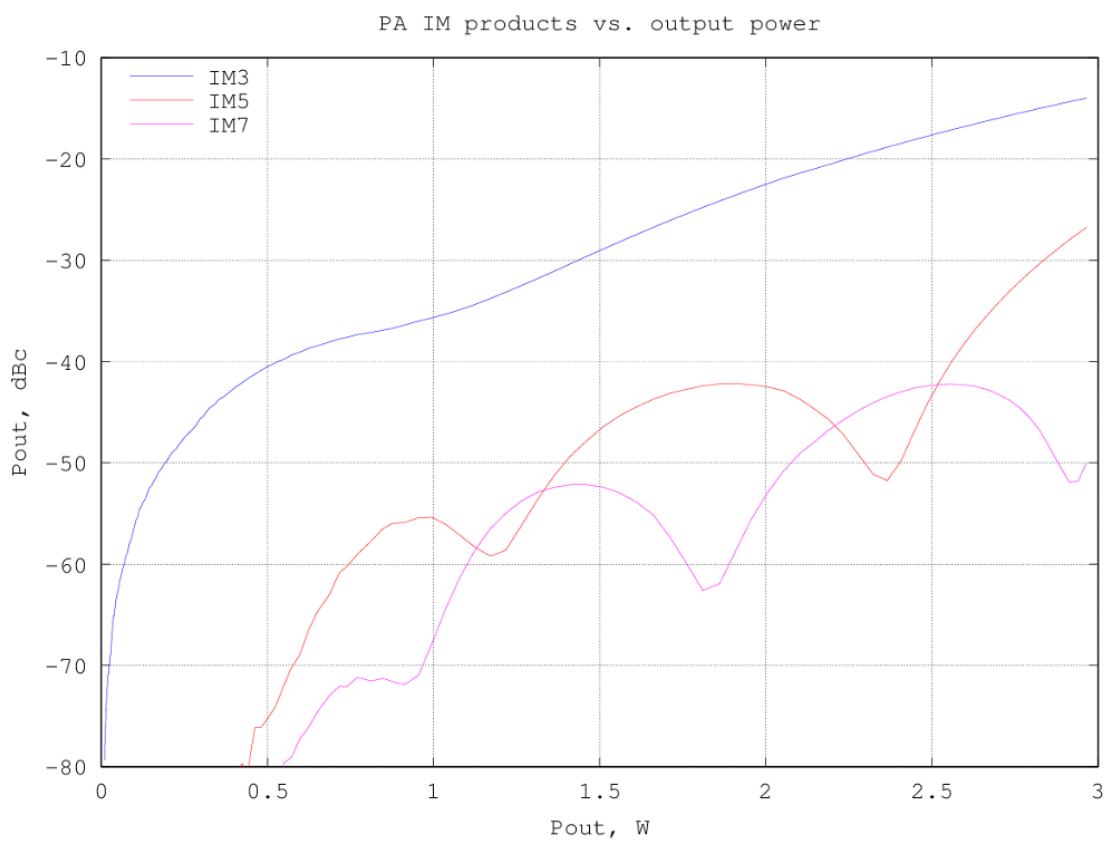
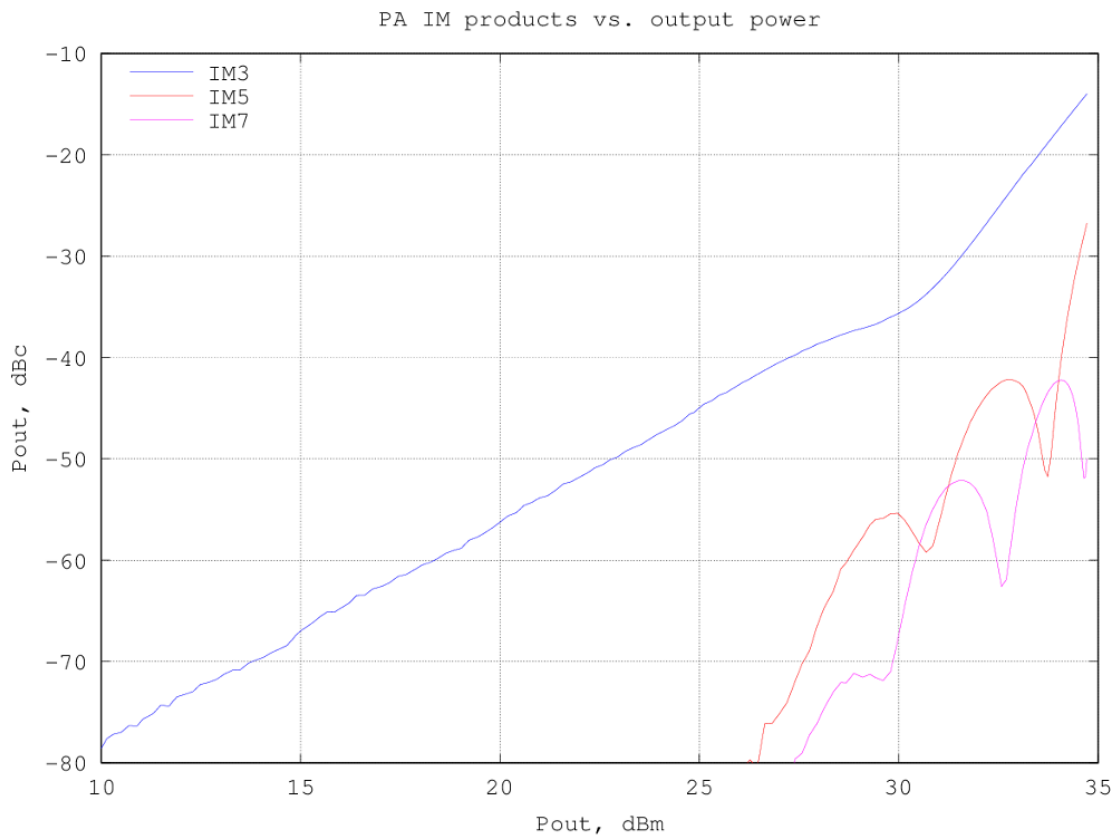


and the resulting efficiency is shown in the graphs below (data are the same for the two graphs, in the first the input and output power are in dBm and in the second they are in watt):





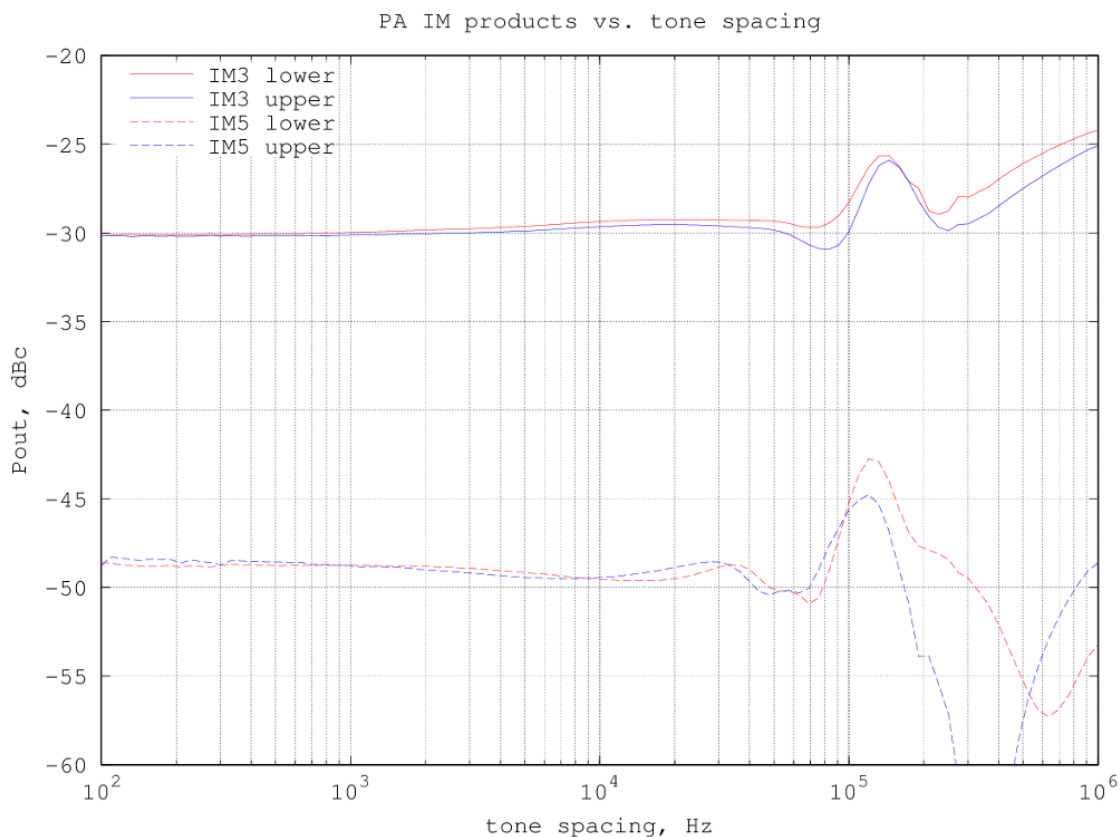
The third-order intermodulation products amplitude w.r.t the output power per-tone is shown in the graph below (to obtain the actual [average] output power multiply the value by two, to have the PEP, multiply by 4):



at an IM3 of -30 dBc the output power is around 1.4 W per tone.

The graph below shows the relative amplitude of the IMD products (separately for upper and lower products) for a two-

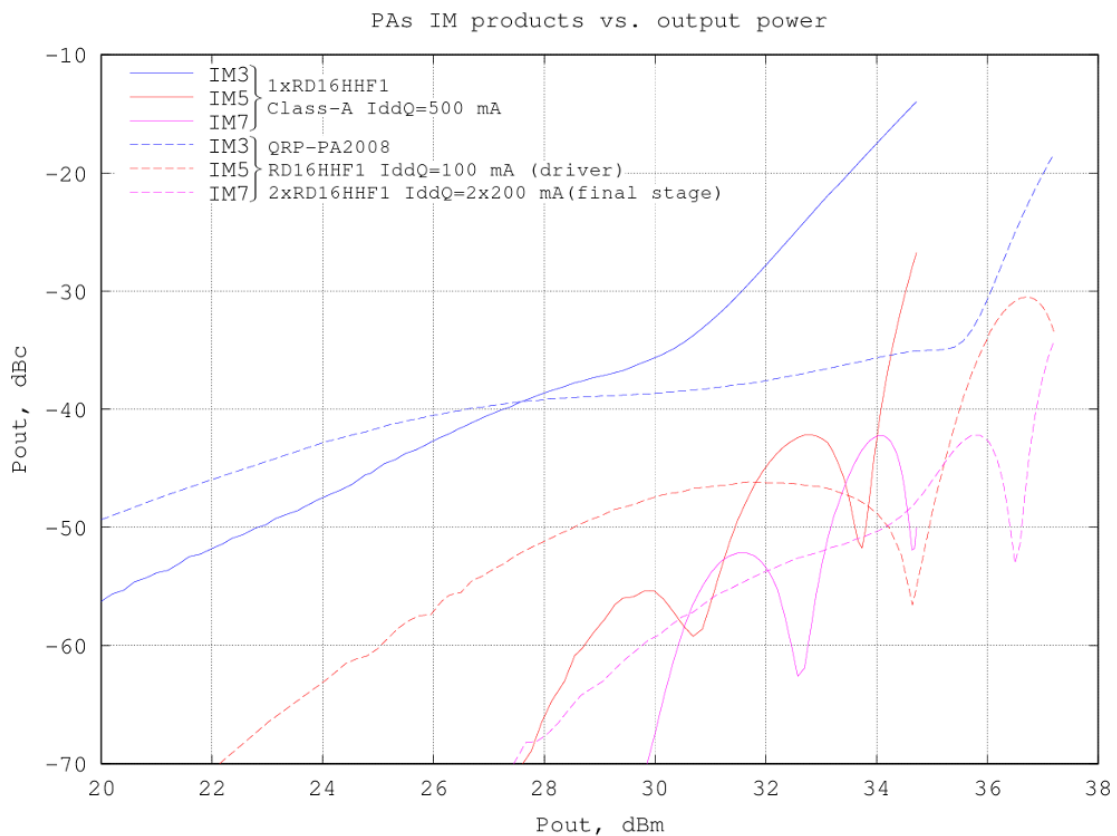
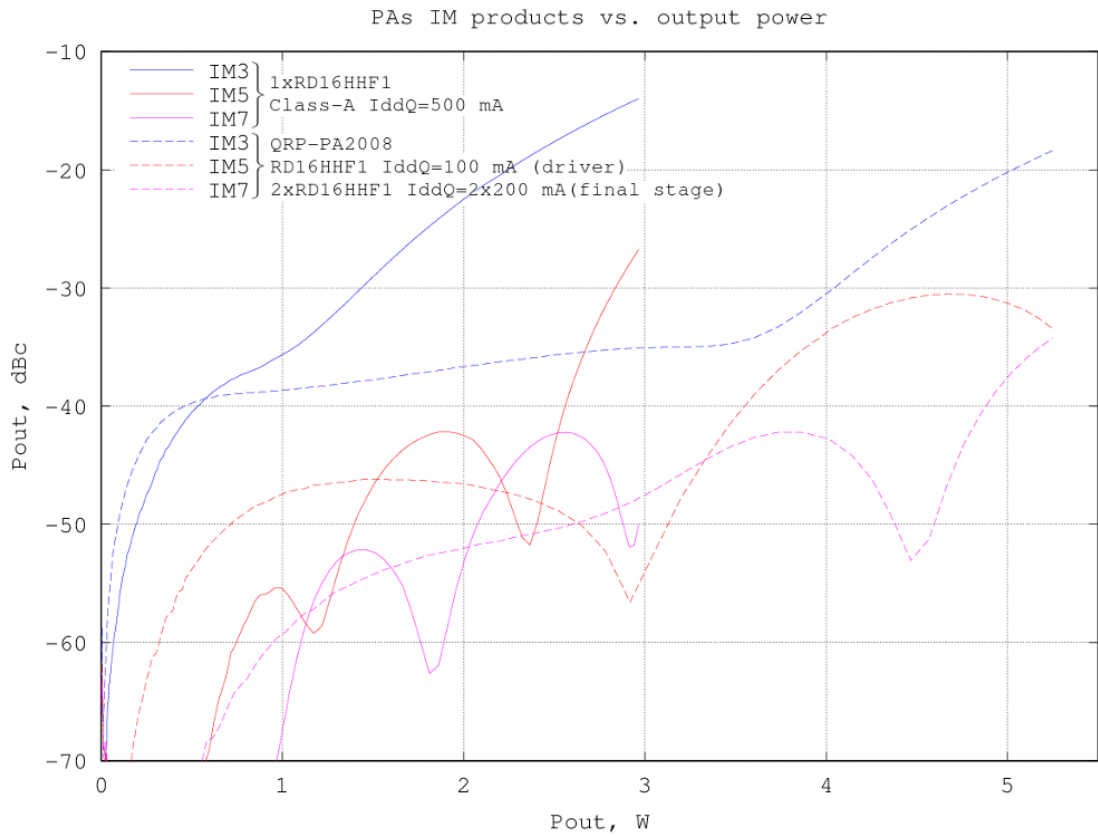
tone test with varying tone spacing at 5.7 W PEP output:



the IMD products are practically at the same level and without much dependency on the tone spacing up to about 100 kHz, where there is probably a resonance of the drain power supply network.

Comparison with the QRP-PA2008

IMD vs. power output compared with the [QRP-PA2008 with higher final stage bias](#) for two tones around 10 MHz with 10 kHz spacing (output power is per-tone).



Harmonics vs. power output compared with the [QRP-PA2008](#) with standard final stage bias with a 10 MHz input tone.

