Intermodulation Distortion (IMD)

When two signals at audio frequencies (e.g at 700 and 1900 Hz) are used to generate a SSB input to any non-linear amplifier, the following rf output components will result:

- Fundamental rf frequencies : f1, f2
- Second order: 2f1, 2f2, f1 + f2, f1 - f2
- Third order: 3f1, 3f2, 2f1 ± f2, 2f2 ± f1,
- Fourth order: 4f1, 4f2, 2f2 ± 2f1,
- Fifth order: 5f1, 5f2, 3f1 ± 2f2, 3f2 ± 2f1, + Higher order terms

The odd order intermodulation products (2f1-f2, 2f2-f1, 3f1-2f2, 3f2-2f1, etc) are close to the two fundamental tone frequencies f1 and f2, and cause the bandwidth of the SSB transmission to spread as illustrated in the following figures :-

Fig.1: Two Signal Spectrum caused by Intermodulation Distortion

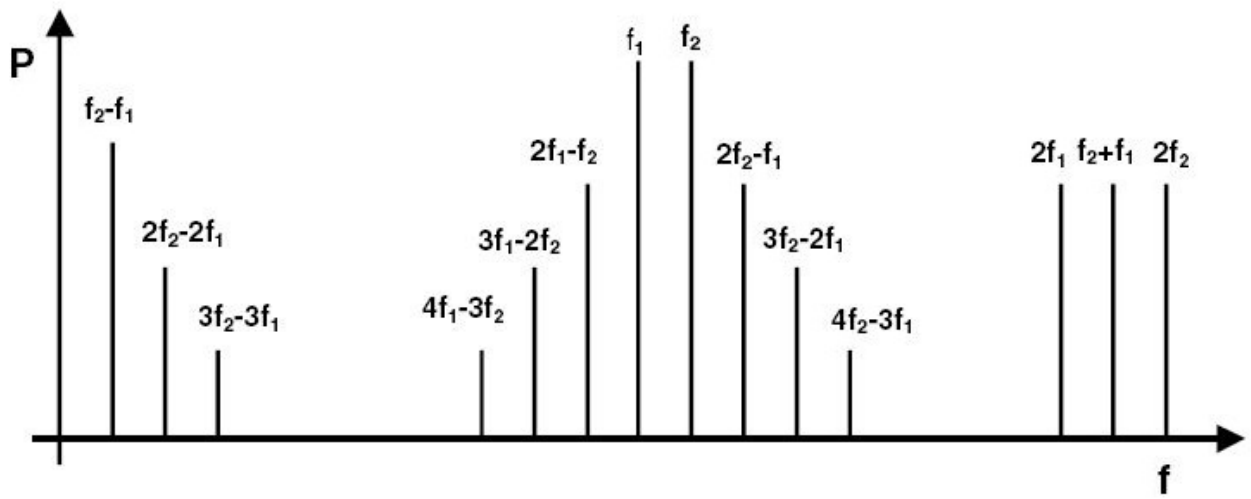


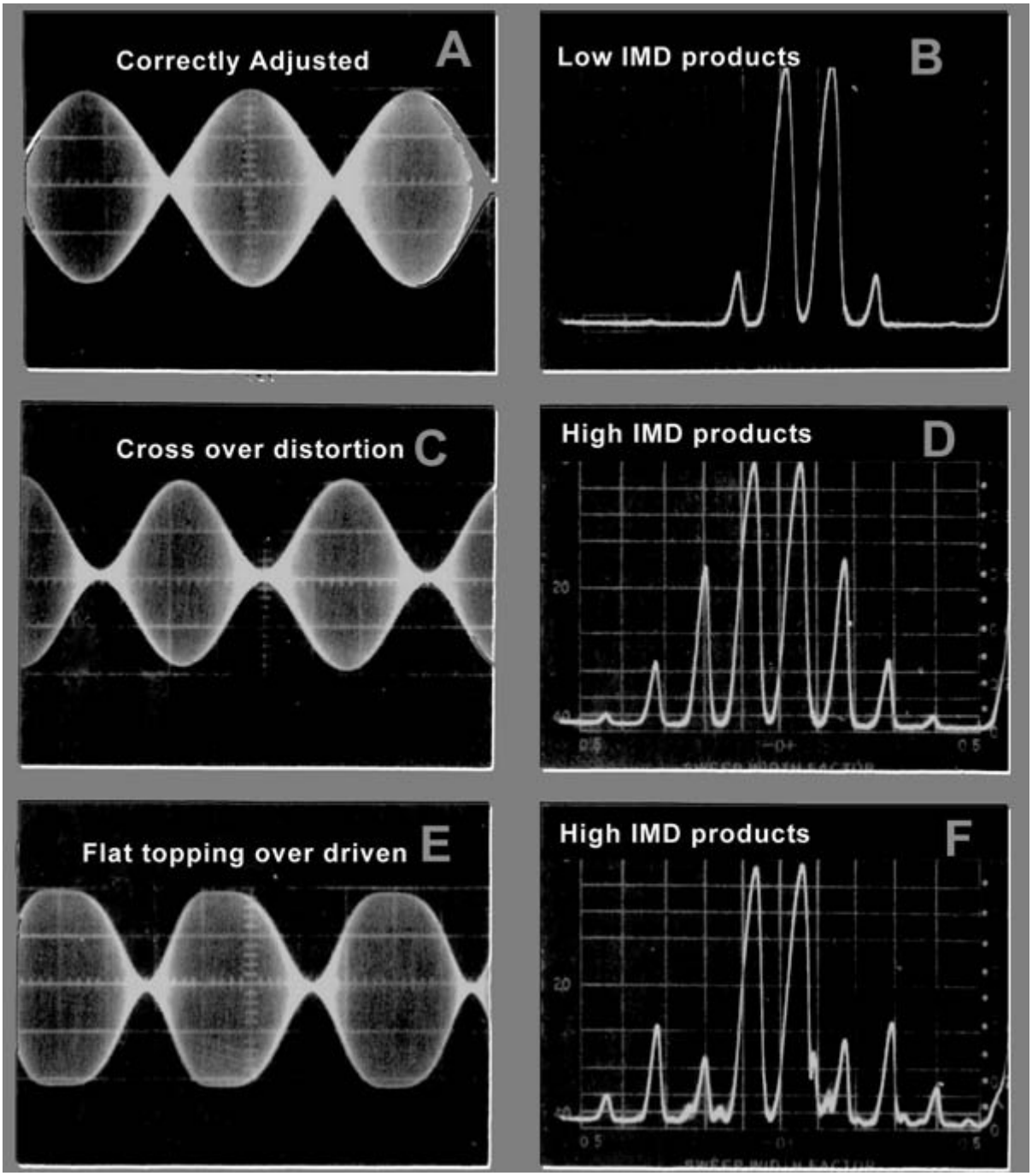
Fig. 2 : Two Tone test, left column scope display, right column spectrum analyzer display

A & B Properly adjusted transmitter having low levels of IMD products.

C & D Crossover distortion resulting in high IMD products.

E & F Flat topping over driven modulation causing splatter and high IMD products.

(Images on the following page)



Ref. PreciseRF Application Note #2, Transmitter Two Tone Test.