Excel Technology Co Pty Ltd

Relationship between

Capacitance

and

Loop Tuning Frequency

Changing 'C' to adjust tuning frequency

Resonant frequency change is the basis of inductive vehicle detection

ω is the frequency in radians/sec
For a resonant circuit:

$\omega = 1 / SQRT(LC)$

Therefore ω is proportional to 1/SQRT(L) or L^-0.5

In other words any variation in L of X% translates to a much smaller variation of ω. However, this variation is not affected by C. C only affects the absolute value of ω.

What does all this mean?

Changing the resonant frequency point for a fixed inductor (a loop) requires changing the capacitance 'C'.

Since C is not related to the change in ω when L changes - it can be stated that doing so is a pointless exercise unless the frequency is be shifted by at least 5Khz and the device must easily accommodate site variations while incurring preset incremental capacitance steps.