

# Tune Up Procedure

The 12-90 is based around a highly integrated RF IC. The deviation of any modulated signal, and transmit frequency is dependent solely on the supplied reference.

The stability of the reference used is  $\pm 0.5\text{ppm}$  over the temperature range  $-30$  degrees Celsius to  $+85$ , but initial tolerance after reflow is  $2\text{ppm}$ . Stability of the reference is  $0.2\text{ppm}$  over its entire operating voltage range. A voltage regulator ensures that the reference operates from a fixed point within its operating voltage range.

Calibration of the reference is performed at room temperature. Calibration is performed by:

1. Issue the command `+99=1<CR>`
2. Transmit a test message and inspect the transmission using a calibrated test set.
3. Issue the command `+X<CR>` to increase the transmit frequency by  $200\text{Hz}$ , or issue `+X-<CR>` to reduce by  $200\text{Hz}$ . Repeat this step until the transmit frequency is centred at the test frequency.

Output power level is checked by transmission of a test message. The absolute maximum output power of the RF IC is  $20\text{dBm}$ . The power level may be decreased by software control, and this is performed to meet some country type approval requirements, but power reduction is not required to meet FCC requirements.

For FCC markets, power level is set to the maximum power for the device – this is a register setting within the RF IC and does not rely on any external components or calibration. There is a small power loss across the RF switch and through the harmonic filter. Output power will vary slightly due to . Therefore the output power level is not set, but checked using the procedure:

1. Transmit a test message.
2. Using a calibrated measurement receiver confirm that the output power is  $+18\text{dBm} \pm 1\text{dBm}$ .