

#### **Requirement 4F: Description of circuits determining frequency.**

##### **Synthesizer and Reference Oscillator**

U19 is a fractional-N synthesizer IC programmed for a specific frequency by loading appropriate serial data into the IC. It controls the receive VCO when the transceiver is in the receive mode of operation, and the transmit VCO when in the transmit mode. The programming lines are labeled 3VSCL, 3VSDA and 3VSYNTHENA on the schematic diagram. These are all CMOS logic level inputs. R118 (RF) and R123 (RN) are the fractional compensation and phase detector current setting resistors, respectively. These resistors are critical to the operation of the synthesizer system and must be checked when troubleshooting around U19. The phase detector output pins (U19-13 and U19-14) are fed to the passive loop filter (R140, C177, C172, R134, and C173) and on to the VCO control varactor diodes (CR17/CR19) for frequency control. The buffered, filtered output from the VCO is fed into U19-5 (RF IN) to close the phase-locked-loop. The level is typically -10 dBm into U19-5. The reference oscillator is made up of CR22, Y2, Q28, C197, and C198 and associated components. The reference oscillator operates at 12.8 MHz. The reference oscillator operating frequency is adjusted by varying the dc voltage at the DAC controlled line that is labeled REFOSCMOD. This line is also used to modulate the reference oscillator during the transceiver's transmit mode of operation. The 12.8 MHz signal is fed into the synthesizer chip at U19-8 (REF IN) using a coupling capacitor, C194. The AC signal level at U19-8 is 1V p-p typically.

U22 is the reference oscillator temperature sensor used to monitor the temperature near Y2. Its output is labeled XTALTEMP on the schematic diagram. This line is normally monitored by the microprocessor so the reference oscillator can be adjusted for drift due to changes in temperature.