Description of all circuitry and devices for determining and stabilizing frequency:

This transceiver uses three VCOs (Mod1, Tx; Mod3, Primary Rx; Mod6, DSC Rx) and two PLL (U5 and U6) circuits to generate the necessary frequencies for receiver LOs and transmitter frequency generation. The reference standard for the synthesized frequencies is **Mod2**. **Mod2** is a TCXO with +/- 2.5 PPM frequency accuracy over the temperature range of -30°C to +60°C.
The **Mod2** signal is divided down internally in the PLL ICs to 20000 (U5) or 2500 (U6) Hz. U5 has a fractional N divider with a Modulo of 8; therefore, the final frequency increment available is 2500 Hz. U6 is a typical PLL synthesizer IC with the dual modulus pre-scaler internally. Both PLL ICs have a phase comparator that generates an error voltage which control the VCO's frequencies and moves the VCO frequencies in a direction that maintains the desired accuracy based on the **Mod2** frequency stability characteristics.

Description of all circuits/devices used for suppression of radiation:

Transmitter harmonic suppression is achieved through the transmitter low pass filter sections. C57, L9 and C58 form a single section π filter for initial filtering of the transmitter harmonics before the directional coupler. This type of section provides for good filtering at the higher harmonics (ultimate rejection). Once the transmit signal goes through the directional coupler and T/R switch (D5), it enters another low pass filter. L12, C64, C65, L13, C67, L14 and C66 form this filter. This filter provides additional filtering especially for the second and third harmonics. It also has some higher harmonic filtering.

Description of all circuits/devices used for limiting modulation:

Microphone audio is pre-emphasis and amplified by U5 (internal microphone) or U19 (external microphone). The output of either one of these amplifiers is then combined with different signalling signals and amplified in U3 where it is also limited. U3 is a complex audio processing IC which also provides the low pass filter to insure good emissions mask response. The audio output signal from U3 is adjusted for +/- 5 kHz deviation by R36. For +/- 2.5 kHz deviation channels, a 6 dB attenuator in U3 is electronically added to the signal path to reduce the signal for +/- 2.5 kHz deviation.

Description of all circuits/devices used for limiting power:

The transmitter RF power output is fed through a directional coupler. A small amount of RF power is then rectified by D4 and filtered by C60. This resultant DC level is then used to control the bias on Q10. Q10 conducts and the resultant voltage drop across R52 reduces the voltage seen at Mod4-Vgg. Vgg's maximum voltage is limited to 4.0 volts. In the 5 watt mode, Q12 is turned ON (R57 shorted). As the RF power output rises above 5 watts, the rectified DC voltage rises which reduces the voltage at Vgg; thereby, lowering the RF output. In the 1/2 watt mode, Q12 is turned OFF. This puts R57 into the circuit and raises the effective voltage seen by the base of Q10. Q10 conducts more, thereby lowering the voltage at Mod4-Vgg. Conversely, if the RF power is sagging the above described feedback loop tries to compensate Mod4-Vgg to supply the desired output power.