2.9 Method of Suppression of Spurious Radiation and Limiting Power {2.983(d)(11)}

The PA stage amplifies the signal from the frequency synthesizer circuits to appropriate output power and employs no multiplier.

2.9.1 Suppression of Spurious Components in the Synthesizer

The RF (1880 MHz) band phase locked loop may cause the spurious components of reference frequency leakage and its harmonics. A phase lag filter and following low pass filter are located between phase detector and the 1880 MHz VCO, and sufficiently suppress these spurious components. The characteristic of this train is shown in Figure 0.1.

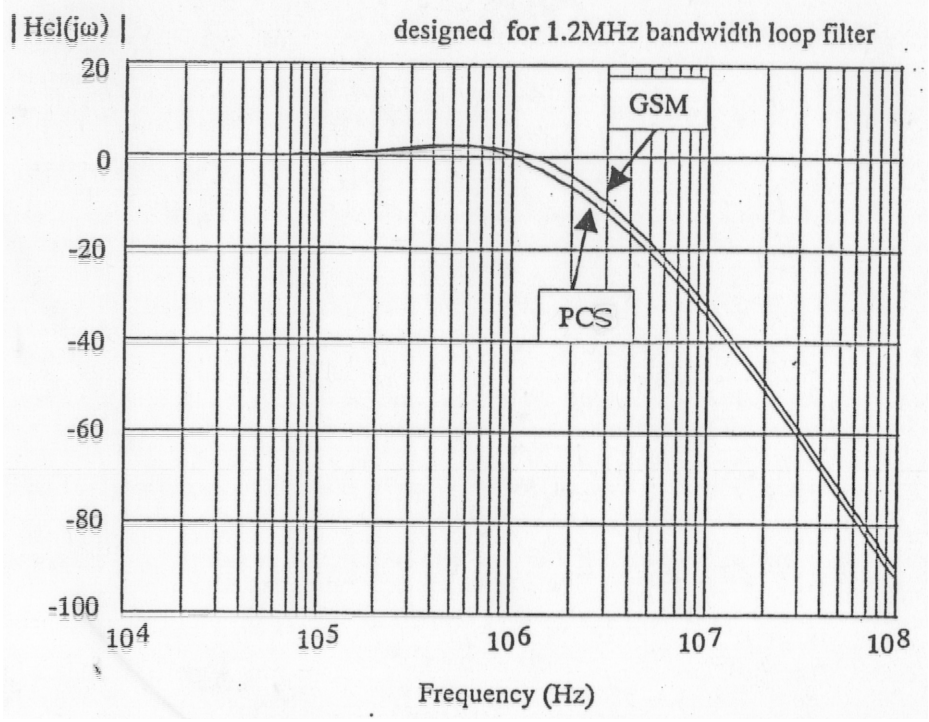

Figure 0.1 Phase Lag Filter plus Low Pass Filter Response Characteristic

2.9.2 Antenna Filter

The antenna discrete filter (L1702, C1701, C1702, C1703, C1704) of the transceiver unit is provided to eliminate out of band noise and spurious or harmonics from the transmitter.

The frequency characteristics of the antenna discrete filter are shown in Figure 0.2.

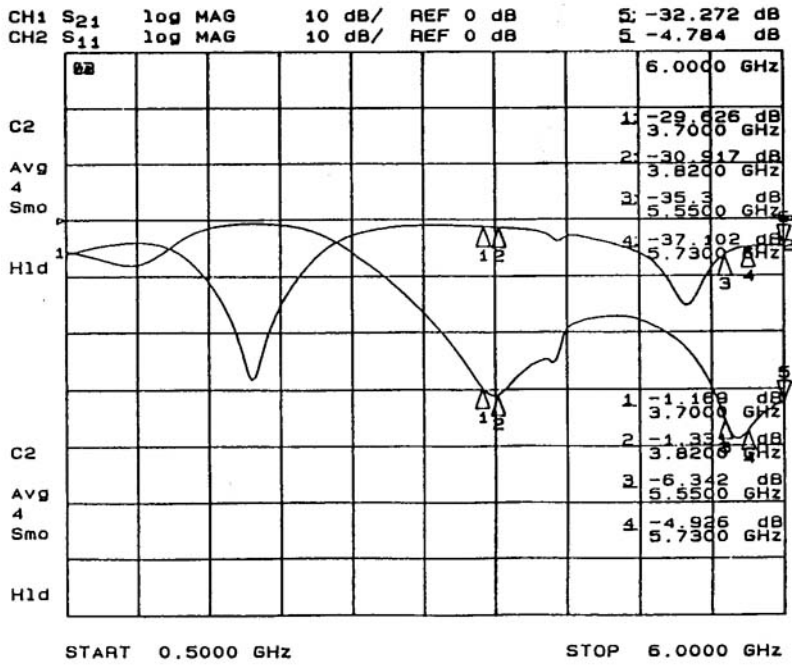

Figure 0.2 Antenna Filter Response Characteristic

2.9.3 Suppression of Spurious falling in the Receiver Frequency Band

The HD15512F (IC1602) generates a modulated signal at intermediate frequency (IF) with a quadrature modulator and converts it to a final frequency with an Offset Phase Locked Loop (OPLL).

The OPLL is simply a phased lock loop (PLL) with a down conversion mixer in the feedback path. The down converter in the feed back path acts as an up converter in the forward path and this allows the output frequency to be different from the comparison frequency without changing the normal operation of the loop. Phase and frequency changes in the reference signal are not scaled, as they would be if a divider were used in the feed back path, and hence the modulation is faithfully reproduced at the final frequency.

The main advantage of the OPLL in this application is that it forms a tracking band pass filter around the modulated signal. The is because the loop cannot respond to phase variations at the reference that are outside its closed loop bandwidth. Thus the broad band phase noise from the quadrature modulator is shaped by the frequency response of the closed loop allowing the TX noise specifications to be met without further filtering.

A second advantage of the OPLL is that the output signal, coming from the VCO, is truly constant envelope. This removes the problem of spectral spreading caused by AM to AM and AM to PM conversion in the power amplifier.

With this description of the OPLL, the spurious falling in the receiver frequency band is sufficiently suppressed.

2.9.4 Suppression of Spurious Emissions by Cabinet

The spurious emissions radiated from devices are suppressed using appropriate shielding techniques.

Each high frequency device is covered with a shield, and the transceiver section is covered with shielding.

Each connection between the printed circuit board and the interface connector terminals at the bottom of the transceiver are protected with the necessary capacitors.

2.9.5 Method of Output Power Control

RF power level is controlled by the APC pin of the power module IC1701 and is adjusted in 2dB steps from +30 dBm (PCL 0) to 0 dBm (PCL 15) in 16 steps.

The RF signal is coupled from Z1700 through Diode D1700 which converts the RF signal to DC.

The DC signal then feeds back to OP-Amp IC1700 and then feeds the APC pin of power module.

2.9.6 Abnormal Transmit Countermeasure

Abnormal transmit checks to see if the transmitter is operating in an incorrect time slot.

If the transmitter attempts to operate in a wrong time slot, the APC pin voltage of IC1701 will appear incorrect to IC300 which then shuts down the transmit function.