

Indian Institute of Information Technology, Allahabad

Electronics and Communication Engineering Department

Course Name: Radar & Satellite Communication

Experiment No. 4

Aim :- Calibration Of Doppler Radar using tuning fork.

CALIBRATION OF DOPPLER RADAR

OBJECTIVE:

Calibration of Doppler radar using tuning fork.

EQUIPMENT REQUIRED: Doppler Radar, Multimedia PC, Tuning Fork

Procedure:

1. Read the frequency of tuning fork written on it. Say, it is 256 Hz that means when stroked it will vibrate at a frequency of 256 Hz.
2. Bring the vibrating tuning fork in front of radar. Radar will detect its vibration, which can be read on frequency counter on PC.
3. If the frequency read is correct to a certain degree of accuracy, Radar is said to be calibrated. Because there could be a certain error in frequency of tuning fork also, due to manufacturing tolerances. The frequency counter on the contrary uses the PC crystal clock to generate the timing pulses and is much more accurate.
4. In case, the detected vibrations are low and radar is unable to display the frequency one can observe the vibrations in FFT mode where they will be much more discernible.
5. The radar uses a calibration factor of 19.49 Hz/Km/hr which has been calculated assuming doppler radar carrier frequency of 10.5 GHz. This is a factor that relates the Doppler frequency to object velocities. The user can program this factor in the software. This factor means that an object moving at 1 Km/hr towards or away from the radar shall produce a Doppler frequency of 19.49 Hz with a carrier frequency of 10.5GHz.
6. Normally, Tuning forks, available are not calibrated so precisely. Therefore to calibrate Radar, we can run one application called **ttg.exe** on another PC and connect speaker on that PC. On setting say, 1KHz from the program, speaker starts vibrating at 1KHz of frequency. This vibration of speaker can further be detected with radar and read out. Once the radar's display is calibrated, tuning fork can be recalibrated, which in turn, is useful at site where PC is unavailable.

Result:

Calibrated radar will measure the frequency, RPM, velocities accurately. Tuning fork provides the standard frequency source, which can be read off from the PC for calibration.

