

Introduction to the F-15 Radar Warning Receiver (RWR)

The Radar Warning Receiver (RWR) on the F-15 is a critical defensive avionics system designed to detect radar signals emitted by enemy aircraft, ground radar installations, and missile guidance systems. Understanding the frequencies detected by the RWR helps comprehend how the F-15 identifies potential threats and alerts the pilot.

Frequency Bands Detected by the RWR

The RWR detects radar signals across a range of frequencies typically used by various radar systems in military applications. These frequencies generally fall within the:

- **VHF (Very High Frequency):** approximately 30 MHz to 300 MHz
- **UHF (Ultra High Frequency):** approximately 300 MHz to 3 GHz
- **L Band:** approximately 1 to 2 GHz
- **S Band:** approximately 2 to 4 GHz
- **C Band:** approximately 4 to 8 GHz
- **X Band:** approximately 8 to 12 GHz
- **Ku and Ka Bands:** ranges higher than 12 GHz, though less commonly tracked by older RWR systems.

How the RWR Uses Detected Frequencies

The F-15's RWR scans a wide swath of the electromagnetic spectrum to pick up active radar emissions such as:

- Target acquisition radar from enemy aircraft
- Ground-based search and tracking radars
- Missile guidance radars

Once detected, the RWR analyzes signal parameters such as frequency, pulse repetition frequency (PRF), and signal strength to:

1. Classify the type of radar threat.
2. Determine the direction of the radar source relative to the F-15.
3. Alert the pilot via visual and audio warnings.

Significance of Frequency Detection

Identifying radar frequency bands allows the RWR to discriminate between friendly and hostile signals and prioritize threats. For example:

- Long-range search radars often operate in lower frequencies (VHF/UHF).
- Target tracking and missile guidance typically employ higher frequency bands (X band or above) because of better resolution.

Summary

In summary, the F-15's Radar Warning Receiver detects radar emissions across a broad frequency range—from approximately 30 MHz up to 12 GHz—to identify and classify threats. This wideband detection capability is essential for timely warning and survivability in hostile environments.