

Operational Description

MARINE RADAR RA53

1. A description of all circuitry and devices provided determining and stabilizing frequency. Rule's No. 2.983(d)-(10)

1.1 The oscillating frequency stability of pulsing magnetron depends upon the load characteristics.

In this radar, the load of the magnetron consists of a duplexer, a waveguide feeder and an antenna, and the load is matched to the magnetron. The VSWR of the load is better than 1.25 within the specified frequency range.

1.2 Receiver

The oscillating frequency stability of FET local oscillator depends upon the supply voltage and ambient temperature. For obtaining the desired frequency stability of oscillator, following means are provided. In addition this radar equips an automatic tuning circuit to coincide the receiver frequency with the transmission frequency.

1.2.1 Temperature compensation

High Q strip line of the oscillator circuitry is employed in the Front-End module due to temperature compensation.

1.2.2 Stabilizing the power supply

DC voltage supplied to the FET local oscillator is stabilized by the regulator. DC voltage across the varactor diode for tuning is supplied from a D/A converter. The voltage across the D/A converter is made by dividing the regulated 24 volts DC. The regulated voltage is generated by regulator on power supply unit. Therefore stable oscillation can be obtained.

2. A description of any circuits or devices employed for suppression of spurious radiation, for limiting modulation, and for limiting the operating power. Rule's No. 2.983(d)-(11)

2.1 Circuits or devices employed for suppression of spurious radiation.

2.1.1 Suppression of spurious radiation from antenna

A duplexer, a waveguide feeder and an antenna perform the narrow band-pass filter and all the spurious signals outside the radar frequency band are

suppressed -50dB lower than main radiation level.

2.1.2-1 Line filters

The line filters are provided on the ship's power supply line as follows; Line filter L6-L9 and capacitors C11-C14, and C87-C88 on POWER PCB in the display unit.

2.1.2-2 Special inter-unit connection cable

A special 12 cores cable shielded by the metal braid is employed for the inter-unit connection and the grounding of the braid are made surely at both ends.

2.2 Circuits or devices for limiting the modulation and operating power

Transmitting tube, pulsing magnetron, operates with negative going high voltage pulse in the modulator. DC 250 volts as the modulator source generated by the DC-DC converter with voltage regulator(power supply unit) is supplied to the modulator to generate the modulating pulse with constant amplitude. Accordingly, modulation and transmitter power level are maintained constant.