

TELERAD

Aeronautical and Maritime Radiocommunication Systems

VHF 700W
TRANSMISSION
SYSTEM FOR
LONG RANGE
COMMUNICATIONS

SE9000X16



OVERVIEW

The VHF Transmission System SE9000x16, with a 700W RF power output was designed for long-range communications in aeronautical band in order to guarantee the coverage plan requirements when there is no possibility for installing remote radios with offset frequency.

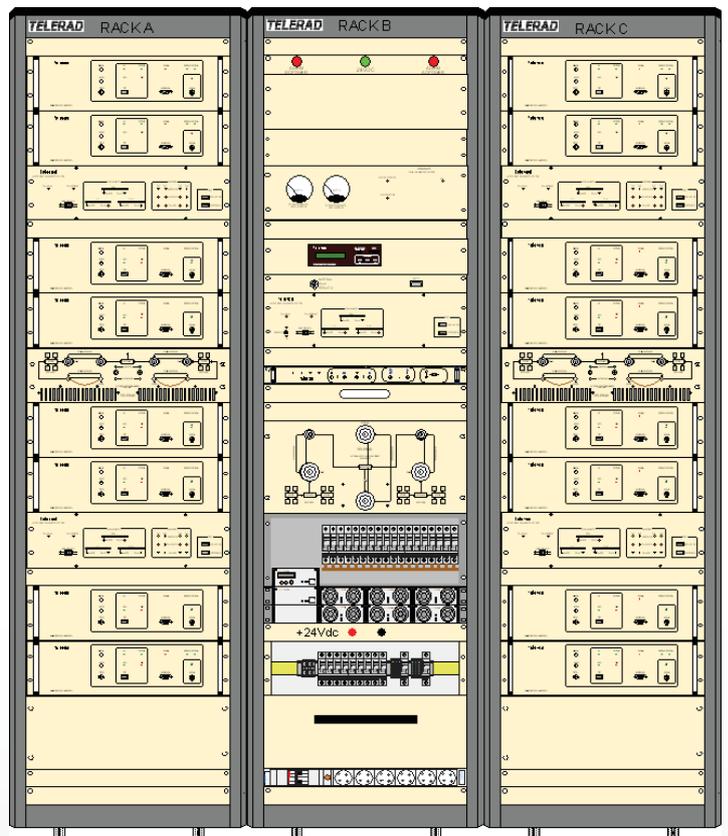
MAIN FEATURES

The 700W Transmission system has been designed according to an original basic concept developed by Telerad and adopted by French Civil Aviation (D.T.I.) from more than 20 years. The basic concept consists of connecting two (2) conventional transmitters (Series 9000) that are supposed to operate as follows:

- they are adjusted with the same output power level,
- they operate with a common RF master oscillator,
- they operate with a common AF modulation signal.

In these conditions, using an RF passive component (an hybrid coupler), the transmitters output power can be added. Then, knowing how to couple two transmitters, there is no more difficulty in coupling pairs of transmitters together. (Telerad has provided a lot of 200W systems realized by coupling four 50W transmitters).

On a same way, the High Power Transmission System SE9000X16 is coupling four 200W sets, in the same way that a 200W system is coupling four transmitters. The global output power is obtained by adding the output power of the sixteen transmitters constituting the High Power System (practically, this global output power will be reduced by the insertion losses of the different coupling stages).



ELECTRICAL CHARACTERISTICS

Radio frequency :

- Frequency Range: 118 to 137 MHz
- Channel Spacing: 25 kHz and 8.33 kHz
- Frequency Stability: ≤ 1 ppm
- Power output with 50: 700 W
- SWR Operation: Nominal power until SWR = 3:1 6 dB, power reduction with SWR > 3:1
- Operation protected against an antenna failure.
- Approximated RF power variation vs number of operational transmitters:
 - All transmitters OK: 0 dB
 - 1 transmitter out of order : -0.58 dB
 - 2 transmitters out of order : -1.16 dB
 - One 200W group out of order (4 transmitters): -2.5dB
 - One 400W rack out of order (8 transmitters) : -6dB

Spectrum:

- Spurious: < -83 dBc
- RF frequency harmonics: < -60 dBc¹
- Broadband noise ($\Delta F > 1\%$ from Fo): < 150 dBc/Hz²
- Adjacent channel power: ≤ -50 dBc

Modulation:

- Audio input: balanced 600 Ω transformer
- Maximum level: +10 dBm
- Sensitivity for 80% : adjustable between -30 and 0 dBm by step of 3 dB
- Modulation type: A3E (voice)
- Modulation ratio: > 80%
- Distortion: < 5%
- Audio bandwidth :
 - In 25 kHz channel spacing:
 - > -3 dB between 300 Hz and 3000 Hz
 - In 8,33 Hz channel spacing:
 - > -3 dB between 300 Hz and 2500 Hz
 - < -30 dB at 3200 Hz
- Audio variation with 30 dB of compression: < 0.5 dB
- Residual noise: < 45 dB under 80%

Power Supply:

- Mains: Single-phase 230 V_{AC} +20/-63%, 45-66 Hz
- Standby consumption: 4 A approximately
- Consumption on transmission: 25 A approximately

CAVITY FILTER CHARACTERISTICS

Insertion loss:

1 dB \pm 0.2 dB

Rejection:

> 35 dB at ± 2 MHz

MECHANICAL CHARACTERISTICS

High power system architecture:

- 3 19 standard racks (2 racks with transmitters and 1 rack with common parts)

Dimensions:

- Total width: 180 cm
- Depth: 80 cm
- Height: 205 cm.

1. The RF frequency harmonics characteristic is due to the circulators included in the SE9000X16 system.

2. To evaluate the electromagnetic compatibility (EMC) in the communication center, the attenuation on harmonics, spurious and broadband noise due to the cavity filter associated with the high power system has to be taken into account.

