

5 kW HF HIGH-POWER TRANSMITTERS FOR AIR TRAFFIC SERVICE

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ROHDE & SCHWARZ

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5 kW HF HIGH-POWER TRANSMITTERS FOR AIR TRAFFIC SERVICE

The R&S®SK4105 HF high-power transmitters combine high transmission power and reliability with a small footprint, making them ideal for air traffic service over large areas under harsh conditions such as those in Greenland.



Fig. 1 (right): Selected aircraft radio stations along the Greenland coast.



Greenland covers over two million square kilometers and is the largest island in the world with a mere 57 000 inhabitants. The airspace is extensive and the transmitter stations remote. Danish air navigation service provider Naviair handles air traffic in the lower airspace via the Flight Information Centre (FIC) in Greenland. In addition, Naviair operates several HF and VHF radio systems at strategic points along the Greenland coast. Communications run mainly through the FIC in the southwestern capital Nuuk. The HF transmitters there are soon to be replaced. In summer 2023, Rohde&Schwarz will supply the low-maintenance and compact R&S®SK4105 shortwave transmitters, which are ideal for such a demanding environment. The R&S®SK4105 transmits in the frequency range from 1.5 MHz to 30 MHz with up to 5 kW transmission power. This high transmission power, enabling long-range radio links from the ground station to the aircraft.

Liquid cooling for a compact and low-maintenance design

Liquid-cooled high-power amplifiers are connected downstream from the signal source. Liquid cooling systems have been widely used in TV and radio station transmitters for years. They are a unique selling point for air traffic control (ATC) transmitters with their compact footprint, reduced maintenance requirements and high reliability. The R&S®SK4105 and pump unit fit into a 19" rack. Air-cooled transmitters from other companies require up to four times as much space and need more maintenance due to mechanical wear and tear.

The coolant flows through an aluminum block, maintaining an optimum operating temperature for the transmitter module mounted on top. This also relieves thermal stress on any other components in the housing and increases the reliability of the overall system. This is very important for transmitters that perform safety-critical tasks and even more for those in remote, snow-bound locations that are very difficult to access. Under such operating conditions, waste heat from the transmitter housing can be used to heat the transmitter shelter.

Overall power requirements and operating costs are lower compared to air-cooled HF transmitters. In regions without Greenland's permafrost, liquid cooling has another advantage. Since the cooling is independent of the outside air, the transmitter requires far less air conditioning.

Future-proof HF transmitter for ATC tasks

The R&S®GX4100 exciter is a key component of the R&S®SK4105 HF high-power transmitter and is already used in several 1 kW HF coastal radio stations for ship traffic in Greenland. The software defined exciter meets EUROCAE ED-137C criteria, meaning new transmitter functions can be integrated and adjustments made to future radio standards with little effort. As part of the CERTIUM® portfolio from Rohde&Schwarz, the HF high-power transmitter is compatible with other hardware and software in the CERTIUM® series and can be expanded to fit any application.

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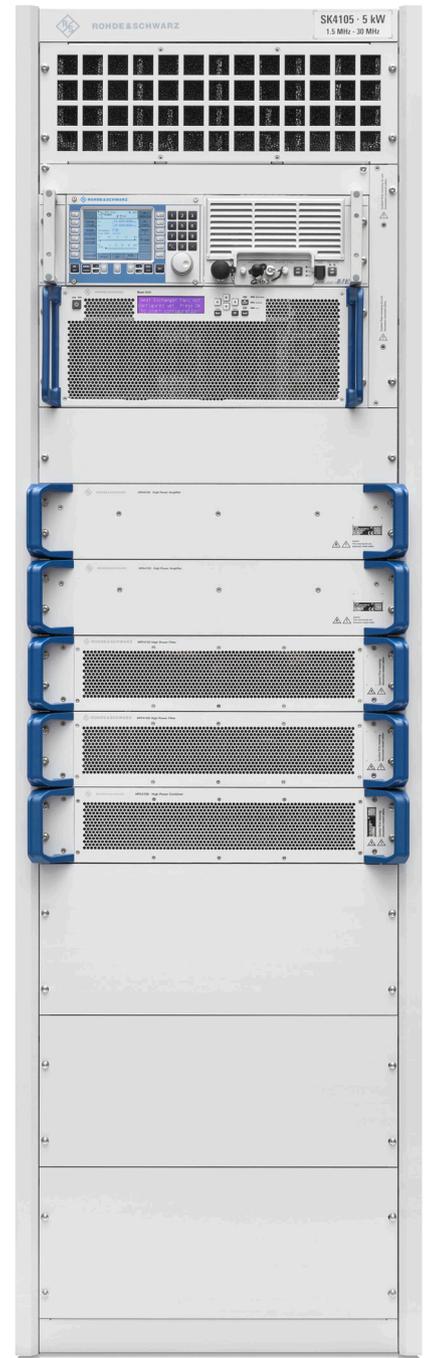


Fig. 2: The R&S®SK4105 HF high-power transmitter can be configured in variants with transmission power from 150 W to 5 kW.

Rohde & Schwarz

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