



HF INTEGRATED COUPLIFIER

The HF Integrated Couplifier is an innovative equipment made up of an RF Power Amplifier (125W) and an Antenna Tuning Unit operating in the frequency range of 1.6 – 30 MHz. This equipment is part of the company's new family of Antenna Tuning Units (ATUs).

It is based on digital processing techniques (DSP) for evaluating the antenna impedance and implementing the tuning algorithm. The digital signal processing combined with high dynamic range A/D conversion allows a proper antenna matching also in collocated environments (the undesired interfering signals are digitally filtered).

The equipment can operate in frequency hopping mode (FH) in the HF frequency range up to 24 hop/s. The architecture and mechanical design of Couplifier make the equipment particularly suitable for vehicular applications. The system can be installed outside the vehicle near to the antenna in order to improve the irradiation capability.

Optionally the Couplifier functionality can be extended to VHF frequency (up to 60MHz), with a nominal RF power of 50W. Fast frequency hopping modes (FFH) can be supported in the VHF up to 400 hop/s. In this case the antenna matching network is bypassed for all frequencies in the hopset.

The Couplifier can be used with several antennas and ensures the antenna matching with a VSWR typically lower than 1.3:1. The antennas are:

- 3m whip antenna (usable between 3 and 60MHz)
- Comrod APX41-LP HF/VHF Whip (5.2 m) (1.6 - 59.975MHz)
- 8m whip antenna (1.6 - 29.99999MHz)
- 10m whip antenna (1.6 - 29.99999MHz)
- 10 to 15m long wire antenna (1.6 - 29.99999MHz)

The HF Integrated Couplifier can be associated to the TURMA HF/VHF transceiver or to the Software Defined Radio (SDR) vehicular platform.

TECHNICAL SPECIFICATION

GENERAL REQUIREMENTS

Frequency range	HF: 1.6 - 30MHz
	VHF (optional): 30 up to 60MHz
Frequency Hopping	Frequency hopping (FH) operation in HF (1.6 - 30MHz), up to 24 hop/s
	Fast Frequency Hopping (FFH) capability in VHF up to 400 hop/s (antenna matching network bypassed)
Antenna matching capability	VSWR<1.3:1 typical
Tuning time	"Learning tune": 1 s (typical), in accordance with STANAG-4203, annex B "Stored tune" (frequency hopping): better than 7.4 ms
Power Supply	+28Vdc nominal, in accordance with MIL-STD-1275D
Power Consumption	< 600W in transmission <100W in reception

MAIN REQUIREMENTS IN TRANSMISSION

Nominal RF output power	125W AVG, PEP in HF (1.6 - 30MHz)
	50W AVG, PEP in VHF (optional)
Duty cycle	100% in SSB voice mode
Harmonic rejection	-55dBc @ 125W, in HF
Intermodulation distortion	IMD3@125W_PEP, better than -30dB with respect to tone level

MAIN REQUIREMENTS IN RECEPTION

Insertion loss	<2dB with cosite filter inserted
Cosite filter rejection	Low-pass 1.6-25MHz: rejection better than 45dBc@30-60MHz
	Low-pass 1.6-30MHz: rejection better than 45dBc@35-60MHz
	High-pass 30-60MHz: rejection better than 45dBc@1.6 - 25MHz

MAIN ENVIRONMENTAL REQUIREMENTS

Operating temperature	-40°C - +55°C
	Degraded operation between +55°C and +71°C
Storage	-40°C - +71°C
Humidity	IAW MIL-STD-810F, method 507.4
Altitude	IAW MIL-STD-810F, method 500.4, proc. I
Salt fog	IAW MIL-STD-810F metodo 509.4
Immersion	IAW MIL-STD-810F metodo 515.4
Sand and dust	IAW MIL-STD-810F metodo 510.4
Vibrations	IAW MIL-STD-810F metodo 515.5
Shock	IAW MIL-STD-810F metodo 516.5 e 525.4
Fungus	IAW MIL-STD-810F metodo 508.5
EMI/EMC	IAW MIL-STD-461D

EXTERNAL INTERFACES

Control Interface (for TURMA)	Ethernet 10/100Mbps (SW upgrade and maintenance)
	#2 RS-232 serial lines (for debug)
	RS-485 serial line for control
	Discrete lines

CONTROL INTERFACE

(SDR vehicular platform)	1Gb Ethernet for control
	#2 RS-232 serial lines (for debug)
	Discrete lines
RF Interfaces	Connector to transceiver (TNC)
	PA output port (N)
	Antenna tuning unit input port (N)
	Insulator to antenna or N adapter

