

Compact SDR receiver of signals of VHF-UHF frequency band “Philin-VU”

Compact receiver of interception and surveillance “Philin-VU” is designed for reception, demodulation and listening within frequency band from 20 to 3000 MHz.

Receiver is controlled by computer via interface USB 2.0 LAN 1 Gbps – optional and provides observation of amplitude spectrum on the screen. Information from receiver’s output is presented in the form of digital quadrature samples transmitted via USB-port (LAN-port) to computer and can be used either for recording or for spectrum observation of received signals. Receiver contains traditional LF outputs for connecting terminal equipment and play back of spoken information.

Receiver is built on the circuit with double frequency changing with IF signal digitizing by 16-bit ADC and DDC conversion into complex form (I/Q-samples) with subsequent signal processing in FPGA and DSP-processor.

Digital signal conversion increased parameters repetition.

Presence in receiver of single antenna output “20-3000 MHz” and connector for antenna-feeder devices control expands capabilities while operating receiver in complexes with different HF-sections and antenna-feeder systems.

Power supply of receiver can be provided either from DC source +7.5 V or from industrial network 220 V, 50 Hz using state power supply source.

SDR-receiver “Philin-VU” is designed for:

- 1) receiving and signal demodulation within frequency band from 20 to 3000 MHz;
- 2) generating I/Q-samples of complex envelope for the following registration and computation of amplitude-frequency spectrum of received radio signals;
- 3) operation on stationary position and in the field.

COMPOSITION

- receiver of VHF-UHF frequency band “Philin-VU”;
- special software for external PC;
- set of connecting cables;
- power supply unit from AC line 220 V, 50 Hz;
- operational documentation.

Technical parameters of VHF-UHF receiver of interception and tracking “Philin-VU”

Name	Parameter
Operating frequency band	20 MHz– 3000 MHz
Antenna input (connector SMA)	$Z_{in}=50$ Ohm
VSWR of antenna input	not more than 2.5
Resolution of receiver adjustment	10 Hz
Frequency tuning time of receiver	not more than 0.5 ms
Relative frequency tuning instability of receiver within operating temperature range	not more than $\pm 2.5 \cdot 10^{-6}$
Modulation	AM, FM, WFM, CW
Bands of digital filters in demodulation mode	4/6,8/10/15/25/50/100/150/250 kHz
Bands of digital filters in the mode of registration I/Q samples of received signals	0.5/ 2.5/ 6.0/ 10/ 12/ 18/ 25/ 50/ 150/ 280/ 400/ 600/ 750 kHz 1/ 1.5/ 2.0/3.0 MHz
Band of frequency capture in AFC mode when receiving signals with FM	not less than $\frac{1}{2} \cdot \Delta F_{\text{digital filter}}$
Sensitivity in AM mode with modulation depth 60% (bandwidth 6.8 kHz, SNR 10dB):	not more than 1 μV
Sensitivity in FM mode with 5 kHz deviation (modulation frequency 1 kHz, bandwidth 4 kHz, SNR12 dB):	not more than 0.6 μV
Sensitivity in CW mode (bandwidth 4 kHz, SNR 10 dB):	not more than 0.4 μV
Noise factor	not more than 13 dB
Attenuation of IF channels	not less than 85 dB
Attenuation of image channels	not less than 80 dB (20-1000 MHz) not less than 60 dB (1000-3000 MHz)
Dynamic range by third order intermodulation	not less than 70 dB
Attenuation of side receiving channels	not less than 75 dB
Level of heterodyne feedthrough to antenna output	not less than -105 dBm
Attenuation adjustment of HF attenuators	coarse 0...30 dB, step 10 dB fine 0...31 dB, step 1 dB
AGC adjustment range from sensitivity level	106 dB
Time constant of AGC “discharge”	0.1/0.5/1/5/10 s
Volume control of LF signal	0...30 dB
Level of LF output for connecting headphones	68 Ohm, 1.0 W
Consumed power: from AC network 220 V/50 Hz from DC source 7.5 V	not more than 9 W not more than 5.6 W
Weight of receiver (with accumulator)	not more than 1.06 kg
Overall dimensions	not more than 86×50×215 mm
Operating temperature range	-10°C ...+50°C



Compact receiver of interception and surveillance “Philin-VU”

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