

Panoramic signal detector of VHF-UHF frequency band “PANORAMA”



External view of panoramic signal detector “Panorama”

Panoramic signal detector of VHF-UHF frequency band “Panorama” is purposed for operational monitoring of radio electronic means on the air within the frequency band 20-3000 MHz.

Operationability of radiomonitoring in the product “Panorama” is achieved due to building of the system on two radio channel circuit, one – is panoramic, another one – executive that enables operator analyze and register signals of detected RES without stopping searching new sources.

High performance DSP with FPGA special computer of FFT built-in into panoramic receiver “Galaktika-UP” provides high speed of frequency searching ($V_{\text{look}} > 15 \text{ GHz/s}$).

Panoramic detector “Panorama” functions in autonomous mode of signals detection, and in the mode of spectrum analyzer under computer control.

Algorithm of spectral-statistical detection of newly appeared signals on the background of existing spectrum load is realized in the product “Panorama” for providing registration of radio environment in monitored frequency band.

Product “Panorama” provides efficient detection of current wideband communication systems including Bluetooth, Wi-Fi etc.

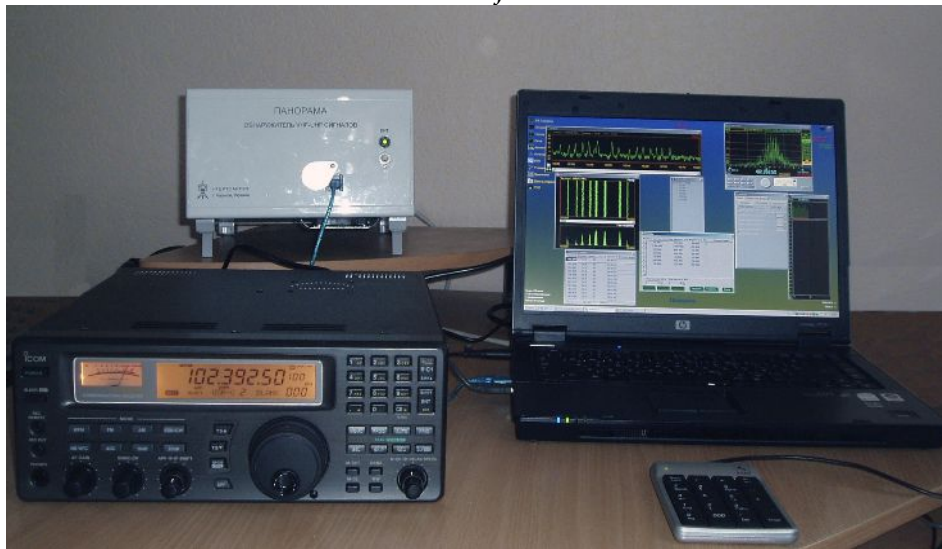
Software of the product contains a function of automatic control of executive receiver of audio control and analysis “Galaktika-U”.

Results of detection are recorded to DB with a possibility of editing, sorting, printing results of operation.

External view with receiver of audio control "Galaktika-U"



External view with receiver of audio control "R-8500M"



Desktop of operator

АЧ Панорама

Обзорная панорама

Спектр

Растр

Анализатор

Очередь вызовов

РЭО

Установки

Диагностика

Панель управления

Старт

Анализатор

Частота: 54 130.27 F2= 54 130.27 F1= 232.306 кГц F3= 54 003.33 Lsp= 17 dB АКФ

Воп: 100 кГц

150 кГц

64 кГц

32 кГц

24 кГц

12 кГц

6 кГц

AM

WFM

Пик: 53 89.97 54 168.97

540 14.17

ПЧ 66 dB

Авт 10 | 20

Набор частоты

1 2 3 4

5 6 7 8

9 0 ВВОД

dB

Стоп

Очередь вызовов

Частота	Полоса	Уров.	Ст.	Время	Комментарий
224.826	5.2	25	Вн	14.48.50	
222.511	4.4	-15		14.48.51	
223.575	3.9	83		14.48.51	
225.895	148.7	19		14.48.51	
228.275	128.7	-11		14.48.51	
228.834	24.2	53		14.48.52	
223.736	45.5	6		14.48.52	
228.394	41.9	-10		14.48.51	
223.054	196.8	98	ВП	14.48.51	
223.717	0.2	56		14.48.50	

Ст = 10 При = 1 Вн = 1

РЭО

СФЧ - 22

Количество обнаруженных сетей СФЧ - 22

N	Частота	Полоса	Уров.	Т. раб.	Выс.	Т. ср.	Т. моста.
13	226.387	9	105	00:00:00	0	00:00:00	14.48.51
14	226.430	2	76	00:00:00	0	00:00:00	14.48.52
15	226.563	6	3	00:00:00	0	00:00:00	14.48.51
16	226.594	2	3	00:00:00	0	00:00:00	14.48.52
17	226.805	6	105	00:00:00	0	00:00:00	14.48.52
18	227.611	5	96	00:00:00	0	00:00:00	14.48.52
19	227.936	5	6	00:00:00	0	00:00:00	14.48.51
20	229.301	9	10	00:00:00	0	00:00:00	14.48.52
21	229.512	6	71	00:00:00	0	00:00:00	14.48.51
22	229.643	1	104	00:00:00	0	00:00:00	14.48.52

Спектр

Частота = 57.275 МГц Уровень = -10 dB Att = 0 dB

Анализатор

Амплитудно-Частотная Панорама

Скан 0.0 мсек.

0% на переобработку

0 загрузочных

Поток 0 ст/мин

Панорама

РЭО-061

РЭО-11

COMPOSITION

Basic modification consists of the following:

- Panoramic receiver “Galaktika-UP”;
- Executive receiver “Galaktika-U” (or IC R8500-M);
- Operator’s board basing on computer Note-Book Pentium Core i7 2.16 GHz;
- Distributing power supply unit;
- Push-button panel of operator;
- Special software of panoramic signal detector;
- Set of connecting cables;
- Operational documentation;
- Case for transportation equipment of the product.

Product “Panorama” can be additionally equipped with:

- Active discone antennas of the frequency band 20-1000 MHz and 1-3 GHz;
- Wideband VHF-UHF signal splitters for two outputs

MAIN FUNCTIONS

- Scanning of 20–3000 MHz frequency band with automatic detection and signal selection by preset parameters;
- Display of amplitude-frequency and frequency-time panorama of radio spectrum load displayed on operator’s board;
- Documenting of loading of group radio frequency spectrum to computer HDD, visual analysis of signals’ spectra and measurement of frequency parameters;
- Audio control by AM/FM detector;
- Operational tuning of radio receiver of audio control to the frequency of detected channel;
- Generating of detected signals queue with their processing (listening, observation, registration) with a possibility of out-of-turn signal processing from the list of priority frequencies;
- Registration of detection of wideband signals with bandwidth of up to 300 kHz;
- Registration of IF signals in the form of I/Q-samples succession to computer HDD;
- Visual analysis of detected signals and measurement of their frequency parameters;
- Viewing, sorting and analysis of accumulated REE data.

TECHNICAL PARAMETERS

- 1) Frequency band of:
- | | |
|-----------------------------------|----------------------|
| Panoramic signal detector | 20 - 3000 MHz |
| Signal receiving and registration | 20 - 3000 MHz |

- 2) Threshold sensitivity of radio section of panoramic signal detector (SNR=10 dB, $\Delta F=12.5$ kHz):

in the frequency band 20 – 1000 MHz	0.8 μV
in the frequency band 1 – 3 GHz	1.0 μV

- 3) Scanning rate including processing of detected frequencies (peak value):

Scanning rate, GHz/s	2	4	8	16
Frequency resolution, kHz	3.125	6.25	12.5	25

- | | |
|---|---|
| 4) Real time BW | 10 MHz |
| 5) Panoramic frequency resolution (at the level –3 dB) | 8 ... 75 kHz |
| 6) Minimal duration of detected signals | 300 μs |
| 7) Dynamic range (by signal level compression 1 dB) | 90 dB |
| 8) Dynamic range by third order intermodulation | 80 dB |
| 9) Suppression of spurious receiving channels | > 80 dB |
| 10) Spectral density of heterodyne noise (with 25 kHz detuning): | |
| at tuning frequency 300 MHz | – 105 dBc/Hz |
| at tuning frequency 1500 MHz | – 95 dBc/Hz |
| 11) Relative frequency instability of panoramic receiver | $\pm 2 \cdot 10^{-7}$ |
| 12) Probability of automatic detection of signal with 3 s duration | |
| in the frequency band 20–3000 MHz | >0.9 |
| 13) Registration of IF signals (I/Q- samples) in the frequency band | 2.5 ...3000 kHz |
| 14) Signals demodulation | AM/NFM/WFM |
| 15) Consumed power not more than | 100 W (without PC) |
| 16) Operating temperature range | 0°... +50°C (without PC) |
| 17) Power supply | network ~220 V/50 Hz
DC network 12 V |

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