

# Wave-X

## Complex

### Applications

The “Wave-X” is a **Hybrid Passive/Active all-in-one GSM monitoring system**. It offers supreme versatility, high efficiency and is suitable for a wide range of applications, including:

- Estimating electronic environment, detecting GSM base stations and determining their parameters;
- Complex automation of setup and startup processes, regardless of the mode selected;
- In Passive mode, monitoring up to 64 GSM cells of any set of providers simultaneously;
- In Active mode, attaching targets’ mobiles to a “fake” base station, monitoring targets’ outgoing and incoming messages in real-time;
- In Active mode, performing additional operations, such as ISDN catcher, GPS coordinate acquiring, voice calls and SMS blocking, etc.
- Operating the system in Active mode in A5/3-only and Half-Rate-only networks;
- A5/1 all-mode real-time deciphering, using onboard standalone deciphering unit;
- Recording all messages, including voice calls, SMS, USSD, DTMF, network specific messages;
- Automatically creating targets in MySQL database using obtained identification parameters (ISDN, IMEI, IMSI, TMSI, Kc);
- Real-time analyzing of obtained information, using filter, graph and period tools;
- Post analyzing of obtained information on any PC or laptop, using database export/import tools;
- Managing the system remotely via LAN, WLAN or UMTS/LTE connection, using any number of terminals simultaneously;
- In-building/in-car usage, low power consumption, easy setup process;



Advantech ACP-4000 4U rackmount chassis



Ariesys ARP670 rugged portable case



Pelican 1450 portable case

## Specifications

### Mechanical and electrical specifications

Possible hardware configurations	two 4U chassis or one portable PC case with one pelican case
Overall weight	< 30 kg
Dimensions of enclosure (W x H x D)	4U case: 482 x 177 x 479 mm Portable PC: 433 x 346 x 227 mm
Input voltage	220V AC / 24V DC (*)
Overall power consumption	<b>less than 800W</b>

## Specifications for passive system

GSM bands supported	E-GSM-900 / DCS-1800 and/or GSM-850 / PCS-1900
Number of GSM cells, available for monitoring	<b>64</b>
Number of providers, available for monitoring	<b>64</b> (limited by the number of cells)
Types of recorded messages	Voice calls, SMS, USSD, DTMF, network specific messages
Supported voice codecs	Full Rate (FR), Enhanced Full Rate (EFR), Half Rate (HR), Adaptive Multi Rate (AMR), Wide-band AMR (AMR-WB)
Number of simultaneously recorded voice calls	<b>Up to 256</b>
Types of encryption supported	A5/0 (open), <b>A5/1</b> , A5/2
Number of antennas	2 (Down/Up)
Range of operation	Down channel – up to 10 Km, Up channel – up to 500 m

## Specifications for active system

GSM bands supported	E-GSM-900 / DCS-1800 and/or GSM-850 / PCS-1900
Number of BTS available	1 BTS (*)
Number of providers, available for monitoring	1 (*)
Types of recorded messages	Voice calls, SMS, network specific messages
Supported voice codecs	Full Rate (FR), Half Rate ( <b>HR</b> )
Number of simultaneously recorded voice calls	<b>Up to 14</b> (*)
Types of encryption supported	A5/0 (open), A5/1, A5/2, <b>A5/3</b>
BTS power amplifier, internal/external	2W/10W
Clone system power amplifier, internal	2W
Number of antennas	2 (Clone/BTS)
Range of operation	Down channel – up to 500 m, Up channel – up to 500 m

\* - as an option, it is possible to install extra hardware;

### There are five Active modes, available for operator:

- Blocking – system accepts all mobiles and blocks all incoming and outgoing calls/SMSs;
- Catcher – system operates as a GSM catcher;
- Catcher+ISDN – system accepts all mobiles with unknown ISDN, automatically gets ISDN and release mobiles to a real network;
- Monitoring – system accepts only prioritized targets, disregarding all others;

- Monitoring+Catcher – system accepts all prioritized targets and reject all others, recording their messages;

**Passive mode view** allows operator to switch system to setup tasks, monitor tasks statistics and control the status of hardware components.

There are two windows in this view – Passive/Tasks and Cells. Passive/Tasks window contains major control tools for Passive operational mode as well as the list of current tasks. Cells window is a list of scanned GSM cells from Cells view.

Operator can use Auto or Manual task setup. In Auto mode, a list of providers must be set from the Providers menu of a tool field.

In Manual mode a task can be set by double-clicking on the cell in Cells window. After the cell is added to the Tasks list, it immediately becomes highlighted. To delete a task use, Delete tool or Del button of a keyboard.

**Passive/Tasks window has the following tools:**

- Off/On switch button;
- Provider – a list of providers for Auto mode;
- Auto/Manual – modes the tasks will be set;
- Busy – a percentage of how busy the hardware is;
- Delete/Delete all – delete selected task/delete all tasks;

Start/End	Band	ARFCN	Tx Power	MCC	MNC	LAC	CID	Provider	UCI	UCI	UCI	RSSI	RSCP	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16		
2017-06-20 16:54:21	808		72					SOCN98	80	541	494	0.38	0	2917	2859	08	AS/1	8	13	0											
2017-06-21 00:30:40	808		62					SOCN98	80	242	80	0.38	0	148	147	09	AS/1	8	3	0											
2017-06-20 16:04:01	2880		80					WECN98	80	128	2	0.38	0	3887	3823	08	AS/1	7	28	0											
2017-06-20 16:54:21	3580		80					SOCN98	80	582	3440	0.38	0.11	3712	3418	00	AS/1	8	15	0											
2017-06-20 16:04:01	3580		71					SOCN98	80	788	8175	0.38	0.15	4438	4355	08	AS/1	8	13	0											

Passive/Tasks Table

SL	Band	AMPS	IS-97	MCC	MNC	Country	Provider	SEC	SEC	LAC	CELL	LOCAL ID	CELL ID	CELL	CA	RA
30	1000		00					4	0			SDCCAR0	1	0		
21	1000		00					8	2			SDCCAR0	80	0		
21	1000		00					2	1			SDCCAR0	00	0		
43	1000		00					4	1			SDCCAR0	1	0		
65	900		00					2	1			SDCCAR0	00	0		
45	1000		00					5	3			SDCCAR0	80	0		
7	900		00					7	0			SDCCAR0	80	0		
44	1000		00					5	0			SDCCAR0	80	0		
60	1000		00					2	1			SDCCAR0	00	0		
35	1000		00					8	4			SDCCAR0	80	0		
81	900		00					8	2			SDCCAR0	00	0		
38	900		00					5	2			SDCCAR0	80	0		
71	900		00					1	0			SDCCAR0	80	0		
52	1000		00					8	1			SDCCAR0	00	0		
73	900		00					4	4			SDCCAR0	80	0		
37	1000		00					1	0			SDCCAR0	00	0		
42	1000		00					8	4			SDCCAR0	80	0		
65	900		00					4	1			SDCCAR0	80	0		
24	1000		00					4	5			SDCCAR0	00	0		
308	1000		00					1	5			SDCCAR0	80	0		
38	1000		00					4	4			SDCCAR0	80	0		
81	1000		00					2	4			SDCCAR0	00	0		
70	900		00					2	1			SDCCAR0	80	0		
17	900		00					8	2			SDCCAR0	80	0		
64	1000		00					8	5			SDCCAR0	80	0		
34	1000		00					8	4			SDCCAR0	80	0		

Cells Table

### Catcher 2G/3G/4G/Downgrader



Catcher camouflaged in a backpack



Catcher 2G/3G/4G



Catcher in Peli case

## Applications

The “Cat-X” is an all-in-one GSM/UMTS/LTE catcher/downgrader device, designed to be operated as standalone device or as a part of “Wave-X” active monitoring system. These are its key features:

- High-performance cellular network scanner; GSM,UMTS and LTE cells detection;
- Complex automation of setup and startup processes;
- Two types of operation – **standalone** or **synchronized** with “Wave-X” active system;
- Rapid switch between GSM/UMTS/LTE modes, no bands limitation;
- Any set of tasks (provider/RAT) is supported, tasks are executed one after another;
- Possibility to downgrade targets’ mobiles from UMTS/LTE to a given GSM cell;
- Automatically creating targets in MySQL database using obtained identification parameters (IMSI, TMSI, IMEI);
- Real-time analyzing of obtained information, using filter, graph and period tools;
- Post analyzing of obtained information on any PC or laptop, using database export/import tools;
- Managing the system remotely via LAN, WLAN or UMTS/LTE connection, using any number of terminals simultaneously;
- Unified with “Wave-X” control application;

## Specifications for catcher system

GSM bands supported	<i>all bands</i>
UMTS bands supported	<i>all bands</i>
LTE bands supported	<i>all bands</i>
Number of TRX onboard	1 (*), universal, one RAT at a time
Power amplifier	<b>15W</b>
Number of antennas	2 (Down/Up)
Range of operation	GSM – up to 500 m; UMTS – up to 250 m; LTE – up to 250 m;
Possible hardware configurations	4U chassis or pelican case
Input voltage	220V AC
Overall power consumption	<b>less than 150W</b>
Overall weight	less than 9 kg (in pelican case)

\* - as an option, more TRX can be added to operate in different RATs simultaneously;