



**Technical  
Specifications**

**Monitoring Suite**

Product Version v24.2

June, 2024

# GO2MONITOR OVERVIEW

The screenshots illustrate the software's workflow:

- 1 Wideband Input:** A spectral plot showing frequency (MHz) on the x-axis and power (dBm) on the y-axis. A narrowband signal is highlighted with a yellow dashed box.
- 2 Wideband Classification:** A table of detected signals with columns for Type, Frequency, Bandwidth, Distance, Symbol rate, and Input. A signal is highlighted in green.
- 3 Production of a selected narrowband signal in production channel:** A detailed view of a narrowband signal with classification results, including modulation (FSK), tone distance, and production status.
- 4 Automatic Monitoring and Tasking:** A task overview table listing various tasks such as 'Wideband search for Pre-Determined Signal Types on HF' and 'Wideband search for Automatic narrowband channel processing'.

Narrowband Classification Results  
 Modem Recognition Results  
 Narrowband I/Q Recordings Results  
 Narrowband Production Results

Result Database



Wideband Classification Results

Wideband Recording Results

Index	Type	Task	Frequency	Hidden	Start time	Duration	Sender ID	Report ID	Communication type	Modulation	Symbol rate	Name
1	Contribution	HF 3000mhz search	5.520MHz	Hidden	08.05.2023 08:46:13.94	00:00:08.802			FSK	FSK	240.000	Contribution
2	Contribution	HF 3000mhz search	5.520MHz	Hidden	08.05.2023 08:46:21.309	00:00:08.277			FSK	FSK	240.000	Production
3	Contribution	HF 3000mhz search	5.520MHz	Hidden	08.05.2023 08:46:25.285	00:00:08.844			FSK	FSK	240.000	Production
4	Contribution	HF 3000mhz search	5.740MHz	Hidden	08.05.2023 08:46:13.241	00:00:08.764			FSK	FSK	240.000	Production
5	Contribution	HF 3000mhz search	5.740MHz	Hidden	08.05.2023 08:46:15.244	00:00:08.135			FSK	FSK	240.000	Production
6	Contribution	HF 3000mhz search	5.740MHz	Hidden	08.05.2023 08:46:17.244	00:00:08.228			FSK	FSK	240.000	Production
7	Contribution	HF 3000mhz search	5.740MHz	Hidden	08.05.2023 08:46:19.244	00:00:08.328			FSK	FSK	240.000	Production
8	Contribution	HF 3000mhz search	5.740MHz	Hidden	08.05.2023 08:46:21.244	00:00:08.385			FSK	FSK	240.000	Production
9	Contribution	HF 3000mhz search	5.740MHz	Hidden	08.05.2023 08:46:23.244	00:00:08.385			FSK	FSK	240.000	Production
10	Contribution	HF 3000mhz search	5.740MHz	Hidden	08.05.2023 08:46:25.244	00:00:08.385			FSK	FSK	240.000	Production
11	Contribution	HF 3000mhz search	5.740MHz	Hidden	08.05.2023 08:46:27.244	00:00:08.385			FSK	FSK	240.000	Production
12	Contribution	HF 3000mhz search	5.740MHz	Hidden	08.05.2023 08:46:29.244	00:00:08.385			FSK	FSK	240.000	Production
13	Contribution	HF 3000mhz search	6.240MHz	Hidden	08.05.2023 08:46:13.241	00:00:02.764			FSK	FSK	240.000	Production
14	Contribution	HF 3000mhz search	6.240MHz	Hidden	08.05.2023 08:46:15.244	00:00:02.764			FSK	FSK	240.000	Production
15	Contribution	HF 3000mhz search	6.240MHz	Hidden	08.05.2023 08:46:17.244	00:00:02.764			FSK	FSK	240.000	Production
16	Contribution	HF 3000mhz search	6.240MHz	Hidden	08.05.2023 08:46:19.244	00:00:02.764			FSK	FSK	240.000	Production
17	Contribution	HF 3000mhz search	6.240MHz	Hidden	08.05.2023 08:46:21.244	00:00:02.764			FSK	FSK	240.000	Production
18	Contribution	HF 3000mhz search	6.240MHz	Hidden	08.05.2023 08:46:23.244	00:00:02.764			FSK	FSK	240.000	Production
19	Contribution	HF 3000mhz search	6.240MHz	Hidden	08.05.2023 08:46:25.244	00:00:02.764			FSK	FSK	240.000	Production
20	Contribution	HF 3000mhz search	6.240MHz	Hidden	08.05.2023 08:46:27.244	00:00:02.764			FSK	FSK	240.000	Production
21	Contribution	HF 3000mhz search	6.240MHz	Hidden	08.05.2023 08:46:29.244	00:00:02.764			FSK	FSK	240.000	Production
22	Contribution	HF 3000mhz search	6.240MHz	Hidden	08.05.2023 08:46:31.244	00:00:02.764			FSK	FSK	240.000	Production

- 1 Wideband Input
- 2 Wideband Classification
- 3 Production of a selected narrowband signal in production channel
- 4 Automatic Monitoring and Tasking
- 5 ResultViewer

## go2MONITOR PRODUCT CONFIGURATIONS

<b>go2MONITOR 1/2/4/8</b>	<ul style="list-style-type: none"> <li>• Radio monitoring, signal classification, signal decoding and signal recording software solution for complete signal scenario surveillance (HF, VHF, UHF, SAT bands)</li> <li>• Core product includes all standard product features.</li> <li>• Optional product features can be added, see optional product features table later in this brochure</li> </ul>
<b>go2MONITOR LOWSWAP</b>	<ul style="list-style-type: none"> <li>• Radio monitoring, signal classification, signal decoding and signal recording software solution for complete signal scenario surveillance (HF, VHF, UHF, SAT bands) optimized for low-SWaP equipment</li> <li>• See comparison table later in this brochure</li> </ul>
<b>go2MONITOR OPERATOR</b>	<ul style="list-style-type: none"> <li>• Application to setup an additional workstation for processing radio signals and viewing the results stored in the central system</li> <li>• go2MONITOR Operator enables several users to access a central go2MONITOR 1/2/4/8 independently of each other and to process signals autonomously <ul style="list-style-type: none"> <li>- Shared access to the processing resources of a central go2MONITOR system</li> <li>- Local use of free narrowband channels for independent signal processing</li> <li>- Access to active wideband signal inputs (controlled centrally)</li> <li>- Viewing and editing of all results in a common, central results database</li> <li>- Installation on an additional workstation (access to the central system via network)</li> <li>- The go2MONITOR Operator product includes one ResultViewer each</li> <li>- With the NRC option it is also possible to assign handoff receivers directly to an operator</li> </ul> </li> <li>• Recommended computing resources: client workstation/notebook with Intel i5 or higher (launch date not older than 3 years), 4 CPU cores with min. 2 GHz clock rate per core, 16 GB RAM and access to the central system via network and Full HD screen</li> </ul>
<b>go2MONITOR RESULT</b>	<ul style="list-style-type: none"> <li>• ResultViewer application to setup an additional workstation for viewing the results stored in the central system</li> <li>• go2MONITOR Result enables several users to access the result data of a central go2MONITOR 1/2/4/8 or LowSWaP independently of each other and to jointly process its results: <ul style="list-style-type: none"> <li>- Shared access to a central go2MONITOR result database</li> <li>- Viewing and editing of all results</li> <li>- Work in parallel while creating new results in the central database</li> <li>- Listen to audio, even from IF recordings</li> <li>- Display filtered and grouped results, graphical and table view, data export</li> <li>- Installation on an additional workstation (access to the central system via network)</li> <li>- The ResultViewer application can display the results of multiple databases (not simultaneously)</li> </ul> </li> <li>• Recommended computing resources: client workstation/notebook with access to the central system via network and Full HD screen</li> </ul>
<b>SIGNAL CLASSIFIER LIBRARY (SCL)</b>	<ul style="list-style-type: none"> <li>• C++ library for integration of automatic signal classifier functionality</li> <li>• Multi-stage classification concept: <ul style="list-style-type: none"> <li>- Signal detection and segmentation</li> <li>- Classification of modulation types</li> <li>- Classification of modems</li> </ul> </li> <li>• Input: <ul style="list-style-type: none"> <li>- Digital IF (complex I/Q) via memory buffer</li> <li>- Digital IF/AF recordings (real / complex WAV 8, 16, 32 Bit)</li> </ul> </li> <li>• Faster than real-time processing depending on hardware performance</li> <li>• Recommended computing resources: Intel i5 or higher (launch date not older than 3 years), min. 2.6 GHz clock rate per core, 1 Core per SCL channel</li> </ul>

<b>go2MONITOR STANDARD</b>	
<b>GUI</b>	<ul style="list-style-type: none"> <li>• Customize GUI and software workflow:               <ul style="list-style-type: none"> <li>- GUI layouts and perspectives depending on use cases</li> <li>- Modem list editor</li> <li>- Frequency list manager</li> </ul> </li> <li>• Supports multiple monitors</li> <li>• Simple and intuitive to operate</li> <li>• Full drag-and-drop support</li> <li>• Language: English or German</li> </ul>
<b>RECOMMENDED COMPUTING RESSOURCES</b>	<ul style="list-style-type: none"> <li>• CPU: Intel i5 or higher (launch date not older than 3 years), min. 2.6 GHz clock rate per core. 2 Cores and 3 GB RAM</li> <li>• Per demodulation and decoding channel additional 1 CPU core and 2 GB RAM</li> <li>• Per 1 MHz max. wideband input bandwidth additional 1.2 GB RAM</li> <li>• Per started 10 MHz max. wideband input bandwidth additional 1 CPU core</li> <li>• HDD/SSD: min. 100 GB or more, depending on total time of signal recording</li> <li>• Screen Resolution: Full HD, multiple monitors recommended</li> <li>• Network: depending on digital IF input bandwidth</li> </ul>
<b>OS</b>	<ul style="list-style-type: none"> <li>• Windows 10/11 de/en, 64 bit with Media Feature Pack</li> <li>• Red Hat Enterprise Linux RHEL 8 (8.8 or higher, 8.8 recommended), 64 bit</li> <li>• Red Hat Enterprise Linux RHEL 9 (9.2 or higher, 9.2 recommended), 64 bit</li> <li>• Ubuntu 22.04 LTS (22.04.2 or higher, 22.04.2 recommended), 64 bit</li> </ul>
<b>LICENCE</b>	<ul style="list-style-type: none"> <li>• USB-Dongle (CodeMeter) as default</li> <li>• Optional: License sharing with license server</li> <li>• The AMBE+2™ voice coding Technology embodied in this product is protected by intellectual property rights including patent rights, copyrights and trade secrets of Digital Voice Systems, Inc. This voice coding Technology is licensed solely for use within this Licensed Product. The user of this Technology is explicitly prohibited from attempting to extract, remove, decompile, reverse engineer, or disassemble the object code, or in any other way convert the Object Code into a human-readable form. US Patent Nos. #8,595,002, #8,359,197, #8,315,860, #8,200,497, #7,970,606, #6,912,495 B2, #6,199,037.</li> </ul>
<b>ISO 9001:2015</b>	<ul style="list-style-type: none"> <li>• Company is certified</li> </ul>

**go2MONITOR STANDARD PRODUCT FEATURES**

<b>RECEIVER CONTROL</b>	<ul style="list-style-type: none"> <li>• Native supported receivers, see later-back</li> <li>• Generic receiver control (frequency, bandwidth, gain, etc.)</li> <li>• Step and scan mode</li> <li>• PSD receiver overview display</li> <li>• Parallel use of receivers from different vendors possible</li> <li>• Support of wide- and narrowband receivers</li> <li>• Hand-off receiver input as additional option: NRC-4/8</li> </ul>
<b>WIDEBAND INPUT, CLASSIFICATION AND RECORDING</b>	<ul style="list-style-type: none"> <li>• Data Acquisition: <ul style="list-style-type: none"> <li>- Digital IF (complex I/Q) via stream or receiver</li> <li>- Digital IF/AF recordings (real / complex WAV 8, 16, 32 Bit, TCI cap file format)</li> <li>- 2 wideband inputs in parallel</li> </ul> </li> <li>• Input bandwidth: <ul style="list-style-type: none"> <li>- Depending on used receiver and hardware resources, limited at 200 MHz</li> </ul> </li> <li>• Wideband classifier bandwidth: <ul style="list-style-type: none"> <li>- Coherent 1 kHz up to 5 MHz (1 MHz HF)</li> <li>- Up to 20 MHz (2.5 MHz HF) as additional option: WCL-10/20</li> </ul> </li> <li>• Waterfall and spectrum display with information like station names and classifier results</li> <li>• Classification of modulation and modem types</li> <li>• Classification modes: <ul style="list-style-type: none"> <li>- Manually triggered</li> <li>- Interval snapshots (at 10, 20, ... . sec)</li> <li>- Continuous classification as additional option: AMT</li> <li>- Sequential snapshot classification in product configuration: go2MONITOR low SWaP</li> </ul> </li> <li>• Recording: <ul style="list-style-type: none"> <li>- Coherent 5 MHz (1 MHz HF)</li> <li>- Up to 20 MHz as additional option: WBR-10/20</li> </ul> </li> <li>• Recommended min. input bandwidth 50 kHz</li> </ul>
<b>MULTI CHANNEL PROCESSING</b>	<ul style="list-style-type: none"> <li>• 1, 2, 4 or 8 channels</li> <li>• Other channel configurations on request</li> <li>• Data Acquisition: <ul style="list-style-type: none"> <li>- Internal DDC I/Q stream from wideband input</li> <li>- Digital IF (complex I/Q) via stream</li> <li>- Digital IF/AF recordings (real / complex WAV 8, 16, 32 Bit)</li> <li>- Hand-off receiver input as additional option: NRC-4/8</li> </ul> </li> <li>• Input bandwidth: 2 kHz - 4 MHz</li> <li>• Additional functions: <ul style="list-style-type: none"> <li>- Live audio listening (analogue and digital voice)</li> <li>- Digital IF I/Q recording</li> <li>- Demodulated bit recording</li> <li>- Live signal analysis (Raster display, I/Q display)</li> <li>- Links to station names from frequency list</li> </ul> </li> <li>• Operation modes: <ul style="list-style-type: none"> <li>- Classification only</li> <li>- Decoding only</li> <li>- Modem recognition and decoding</li> <li>- Full automatic (classification, modem recognition, decoding)</li> <li>- Analogue audio only in product configuration: go2MONITOR low SWaP</li> </ul> </li> <li>• Result feedback in GUI and database</li> </ul>

## go2MONITOR STANDARD PRODUCT FEATURES

<p><b>DEMODULATION AND DECODING</b></p>	<ul style="list-style-type: none"> <li>• Universal demodulators: <ul style="list-style-type: none"> <li>- AGC, AFC and automatic baud rate synchronization</li> <li>- Blind or modem specific equalization</li> <li>- Pre-parametrized related to the selected decoder/modem</li> </ul> </li> <li>• Extensive list of available standard decoders</li> <li>• PMR/SAT and MIL decoder packages as additional option</li> <li>• Latest decoder list: <a href="http://www.procitec.com/go2signals-decoderlist">www.procitec.com/go2signals-decoderlist</a></li> <li>• Special decoder functions: <ul style="list-style-type: none"> <li>- Multiple data output (text, audio/voice, files, raw, ...)</li> <li>- Automatic modem recognition with adjustable decoder list</li> <li>- No loss of data during analyzing, modem recognition and protocol changes (first bit)</li> <li>- Decryption functions (automatic key detection, manual key input)</li> <li>- Parametrizable decoders (alphabet, encryption keys, framing parameters, etc.)</li> <li>- Extendable with user-defined decoders based on Decoder Description Language pyDDL (with go2DECODE Professional)</li> <li>- Content metadata post processing (customizable)</li> </ul> </li> <li>• Output: <ul style="list-style-type: none"> <li>- Decoder result window, configurable format by XSLT</li> <li>- All results are continuously saved in database</li> <li>- Metadata and content (text, audio, graphic, binaries)</li> <li>- Post-processing results: sender ID, recipient ID, position, etc.</li> <li>- Alarming based on post-processing results</li> <li>- Various export functions</li> </ul> </li> </ul>
<p><b>STANDARD AUTOMATION</b></p>	<ul style="list-style-type: none"> <li>• Mission and task planning for multi-channel processing</li> <li>• Triggers based on wideband signal detection: <ul style="list-style-type: none"> <li>- Signal energy</li> <li>- Modulation type</li> <li>- Modem type</li> </ul> </li> <li>• Filter: <ul style="list-style-type: none"> <li>- Signal parameters</li> <li>- Frequencies (band, fixed frequency, frequency channels)</li> <li>- Blocked frequencies (band, fixed frequency, job-specific and system wide)</li> <li>- System location</li> <li>- Time</li> </ul> </li> <li>• Tasks: <ul style="list-style-type: none"> <li>- Type: Wideband signal search with live processing</li> <li>- Additional task types as option: AMT</li> <li>- Enhance processing capacity and speed with additional option: WMPC-16/32</li> </ul> </li> <li>• Alarming for signal detection in wideband</li> </ul>

**go2MONITOR STANDARD PRODUCT FEATURES**

<b>RESULTVIEWER</b>	<ul style="list-style-type: none"> <li>• Display, filter, edit and export from result database</li> <li>• Display of: <ul style="list-style-type: none"> <li>- Decoder output</li> <li>- Demodulated audio files (CW, TETRA, etc.)</li> <li>- Text output (ALE, HFDL, etc.)</li> <li>- Binary and graphical files</li> <li>- Audio demodulation and playback</li> <li>- Recognized modems (protocols)</li> <li>- Wide- / narrowband classification results</li> <li>- Recorded wide- / narrowband IF-signals</li> <li>- Result metadata like time, frequency, modulation, etc.</li> </ul> </li> <li>• Functions: <ul style="list-style-type: none"> <li>- Advanced filter</li> <li>- Filter data using GUI, SQL or scripting</li> <li>- Sorting and grouping function</li> <li>- Mark cells in table using user-defined rules</li> <li>- Manual correction of results (with bulk editing mode)</li> <li>- Windows are implemented as docking /floating windows and can be freely positioned</li> <li>- Table and graphical (time-frequency plane) result display</li> <li>- Listen to audio, even from IF recordings (includes demodulation)</li> <li>- Select, extract (DDC) and store emission from wideband recording as independent recording</li> </ul> </li> </ul>
<b>INTEGRATION</b>	<ul style="list-style-type: none"> <li>• API for application control and streaming (full back-end integration possible)</li> <li>• Receiver control and integration framework (RCM)</li> <li>• VITA 49 and ExtIO</li> <li>• Generic PROCITEC/PLATH IF streaming interface</li> <li>• Several customization possibilities based on Python scripting for DF, content post-processing, data export, etc.</li> </ul>

## go2MONITOR OPTIONAL PRODUCT FEATURES

<b>PMR DECODER</b>	<ul style="list-style-type: none"> <li>• Additional set of PMR/SAT decoders, see <a href="http://www.procitec.com/go2signals-decoderlist">www.procitec.com/go2signals-decoderlist</a></li> <li>• May require export approval prior to supply</li> </ul>
<b>MIL DECODER</b>	<ul style="list-style-type: none"> <li>• Additional set of military demodulators and decoders, see <a href="http://www.procitec.com/go2signals-decoderlist">www.procitec.com/go2signals-decoderlist</a></li> <li>• Requires export approval prior to supply</li> </ul>
<b>WIDEBAND INPUT CLASSIFICATION 10 OR 20 MHZ</b>  <b>(WCL-10/20)</b>	<ul style="list-style-type: none"> <li>• Increase wideband classifier bandwidth</li> <li>• WCL-10: Coherent up to 10 MHz (1 MHz HF)</li> <li>• WCL-20: Coherent up to 20 MHz (2.5 MHz HF)</li> <li>• Recommended additional computing resources: WCL-10: 2-4 CPU cores. WCL-20: 4-8 CPU cores</li> </ul>
<b>WIDEBAND RECORDING 10 OR 20 MHZ</b>  <b>(WBR-10/20)</b>	<ul style="list-style-type: none"> <li>• Increase wideband recording bandwidth</li> <li>• WBR-10: Lossless recording of up to 10 MHz</li> <li>• WBR-20: Lossless recording of up to 20 MHz</li> <li>• Recording scheduler and loop recording as additional option: AMT</li> <li>• Recommended additional computing resources: CPU: 1-2 CPU cores, HDD/SSD volume depends on total time of signal recording, HDD/SSD speed for WBR-10: 500 Mbit/s and WBR-20: 1 Gbit/s sustained write speed</li> </ul>
<b>ENHANCED AUTOMATION</b>  <b>(AMT)</b>	<ul style="list-style-type: none"> <li>• Additional Automation features: <ul style="list-style-type: none"> <li>- Continuous classification mode</li> <li>- Task types: <ul style="list-style-type: none"> <li>- Wideband signal search with automatic narrowband channel processing</li> <li>- Continuous fixed-frequency monitoring</li> <li>- Wideband recording (time based or emission triggered)</li> </ul> </li> </ul> </li> <li>• Enhance processing capacity and speed with option: WMPC-16/32</li> </ul>
<b>WIDEBAND MULTI PRODUCTION 16 OR 32 CHANNELS</b>  <b>(WMPC-16/32)</b>	<ul style="list-style-type: none"> <li>• Extends the number of channels with functionality channelizing (DDC), classification, analog demodulation and recording in steps of 16, 32 or more</li> <li>• Raises channel speed for digital demodulation and decoding faster than real-time (in average: 4-times faster)</li> <li>• Enhance processing capacity and speed for automatic processing with option: AMT</li> <li>• If in combination with WCL-10/20, recommended additional computing resources (in addition to standard and WMPC-16/32 recommendations): WMPC-16: 1-2 CPU cores and 4 GB RAM. WMPC-32: 2-4 CPU cores and 8 GB RAM</li> <li>• Requires export approval prior to supply</li> </ul>
<b>NARROWBAND RECEIVER CONTROL 4 OR 8 CHANNELS</b>  <b>(NRC-4/8)</b>	<ul style="list-style-type: none"> <li>• Receiver control for handoff receivers</li> <li>• Process signals parallel and independent from wideband input</li> <li>• Handoff signal production triggered by wideband scan receiver result as additional option combined with: AMT</li> <li>• NRC-4: enables up to 4 handoff receivers for go2MONITOR 1/2/4</li> <li>• NRC-8: enables up to 8 handoff receivers for go2MONITOR 8</li> </ul>



**go2MONITOR OPTIONAL PRODUCT FEATURES**

<b>HOPPER DETECTION (HOPD)</b>	<ul style="list-style-type: none"> <li>• Recognition and recording of hopper signals in combination with AMT (use option WBR-20 to enlarge recording bandwidth needed)</li> <li>• Minimum signal duration: 2 seconds, at least 100 hops</li> <li>• Minimum signal bandwidth: 250 kHz</li> <li>• Hop rate: 5 to 50 hops/s for HF or 100 to 1.000 hops/s for V/UHF</li> <li>• Minimum hop bandwidth: 1 kHz</li> <li>• Recommended additional computing resources for 20 MHz max input bandwidth: 4-8 CPU cores and 24 GB RAM</li> <li>• Requires export approval prior to supply</li> </ul>
<b>REMOTE CONTROL API</b>	<ul style="list-style-type: none"> <li>• C++ library and API interface for system integration</li> </ul>
<b>RCM FRAMEWORK</b>	<ul style="list-style-type: none"> <li>• C++ framework for receiver integration</li> </ul>

**FEATURE COMPARISON TABLE go2MONITOR 1/2/4/8 vs. low-SWaP**

<b>FEATURE</b>	<b>go2MONITOR 1/2/4/8</b>	<b>go2MONITOR low-SWaP</b>
<b>Wideband classification</b>	Instantaneous snapshot and continuous classification	Sequential snapshot classification
<b>Wideband I/Q input bandwidth</b>	Depending on receiver and hardware resources	Depending on receiver and hardware resources
<b>Wideband recording function</b>	Yes	No
<b>Rule based fixed frequency to channel allocation</b>	Yes	Yes
<b>Product option enhanced automatic monitoring and tasking (AMT)</b>	Yes (dynamic)	No
<b>Channel with fully automatic modem recognition, demodulation and decoding</b>	Yes	No
<b>Channel limited to demodulation of analog signals</b>	No	Yes
<b>Channel limited to demodulation and decoding of digital signals</b>	No	Yes
<b>Channel with signal buffer (decoding of the first bit)</b>	Yes	No
<b>All channels include recording function</b>	Yes	Yes
<b>Automatic alerting and notification ('cross-cue') to 3rd-party systems (e.g. ISR/CEMA assets)</b>	Yes	Yes
<b>Additional PMR and MIL decoder packages available</b>	Yes	Yes
<b>Product option multichannel production (WMPC)</b>	Yes	No
<b>Integration based on API</b>	Yes	No
<b>Includes support for receivers, classification, demodulation, decoding and decryption</b>	Yes	Yes

**go2MONITOR / SIGNAL CLASSIFICATION LIBRARY MODULATION CLASSIFIER\***

<b>Modulation</b>	<b>Spec. general</b>	<b>Spec. HF</b>	<b>Spec. V/UHF</b>	<b>Recognition quality</b> <small>(Eb/No) for a detection rate &gt; 90% and false alarms &lt; 1%</small>
<b>Max. signal bandwidth</b>		50 kHz	50 kHz – 80% of input bandwidth	
<b>Signal energy detection min. SNR</b>		6 dB	6 dB	
<b>Analogue modulated voice detection (no SELCALs)</b>		<ul style="list-style-type: none"> <li>• USB J3E</li> <li>• LSB J3E</li> <li>• AM A3E</li> <li>• DSB-SC</li> </ul>	<ul style="list-style-type: none"> <li>• USB J3E</li> <li>• LSB J3E</li> <li>• AM A3E</li> <li>• NFM F3E (Radio frequency <math>\geq</math> 25 MHz)</li> <li>• DSB-SC</li> </ul>	
<b>ASK 2/4</b>			100 Bd – 50 kBd	14 – 18 dB
<b>FSK 2</b>	m = 1 - 10	25 - 4800 Bd	1.2 - 25 kBd	11 - 15 dB
<b>FSK 2</b>	m = 0.75 - 1.5		25 - 75 kBd	$\geq$ 25 dB
<b>FSK 4</b>	(shift > sr)	25 - 4800 Bd	1.2 - 25 kBd	14 - 16 dB
<b>GMSK</b>	m = 0.5	300 - 4800 Bd	1.2 - 125 kBd	14 - 16 dB
<b>MCFSK2</b>	m $\geq$ 1; 2 - 64 channels	40 - 250 Bd 120 - 1000 Hz channel spacing (min. 2x shift)	40 - 250 Bd 120 - 1000 Hz channel spacing (min. 2x shift)	17 dB
<b>MORSE</b>		30 - 250 CPM	30 - 250 CPM	
<b>MSK</b>	m = 0.5	100 - 4800 Bd	1.2 - 125 kBd	14 - 16 dB
<b>Multitone FSKn</b>	5 - 64 tones (shift > sr)	3 - 200 ms (5 - 330 Bd)	3 - 200 ms (5 - 330 Bd)	14 - 16 dB
<b>OFDM</b>		<b>Bandwidth <math>\leq</math> 50 kHz</b> <ul style="list-style-type: none"> <li>• 25 - 512 Channels</li> <li>• Tg/Tu 0.125 - 1</li> <li>• Max. channel spacing 250 Hz</li> <li>• Min. 25 Bd (Tested with PSK8 channel modulation)</li> </ul>	<b>Bandwidth <math>\leq</math> 50 kHz</b> <ul style="list-style-type: none"> <li>• See Spec. HF</li> </ul> <b>Bandwidth &gt; 50 kHz -12.5 MHz</b> <ul style="list-style-type: none"> <li>• 128 - 32768 Channels</li> <li>• Tg/Tu 0.0625 – 0.25</li> <li>• Max. channel spacing 15 kHz</li> <li>• Min. 50 Bd (Tested with PSK8 channel modulation)</li> </ul>	14 - 18 dB

\* Measurement conditions: Typically, 4 seconds sample and correct segmentation of emission. Signal bandwidth is not more than 80% of the input bandwidth.  
Shift is defined as frequency difference between neighboring tones.

<b>go2MONITOR / SIGNAL CLASSIFICATION LIBRARY MODULATION CLASSIFIER*</b>				
<b>Modulation</b>	<b>Spec. general</b>	<b>Spec. HF</b>	<b>Spec. V/UHF</b>	<b>Recognition quality</b> <small>(Eb/No) for a detection rate &gt; 90% and false alarms &lt; 1%</small>
<b>OTH Radar</b>	FM-CW variants only	Detection only		
<b>Multichannel (D)PSK 2, 4 A/B</b>	max. 10 kHz signal bandwidth; 2 - 64 channels	31.25 - 250 Bd 50 - 300 Hz channel spacing	31.25 - 250 Bd 50 - 300 Hz channel spacing	13 - 15 dB
<b>(D)PSK 2 A/B</b>		31.25 - 4800 Bd	1.2 kBd - 50 MBd	7 - 10 dB, A/B Decision: 8 - 15 dB
<b>(D)PSK 4 A/B</b>		31.25 - 4800 Bd	1.2 kBd - 50 MBd	8 - 12 dB, A/B Decision: 10 - 15 dB
<b>(D)PSK 8 A/B</b>		31.25 - 4800 Bd	1.2 kBd - 50 MBd	HF: 8 - 12 dB, A/B Decision: 10 - 15 dB V/UHF: 10 - 14 dB, A/B Decision: 12 - 15 dB
<b>OQPSK **</b>			100 Bd - 50 MBd	10 dB
<b>PSK 16</b>		300 - 4800 Bd	1.2 kBd - 50 MBd	14 - 16 dB
<b>QAM</b>	Order: 8, 16, 32, 64 Selected constellations	100 - 4800Bd (Constellation dependent, at least 50 symbols per constellation point within classification interval)	100 Bd - 12.5 MBd (Constellation dependent, at least 50 symbols per constellation point within classification interval)	Constellation dependent 12 - 20 dB
<b>FM-PSK</b>	After FM-demodulation PSK is searched in 300 - 3400 Hz band		100 - 2400 Bd	
<b>WFM (FM Broadcast only)</b>			Radio frequency: 65 MHz - 108 MHz Bandwidth: 50 kHz - 300 kHz	

\* Measurement conditions: Typically, 4 seconds sample and correct segmentation of emission. Signal bandwidth is not more than 80% of the input bandwidth.

Shift defined as frequency difference between neighboring tones.

\*\* Includes ML/AI technology

**go2MONITOR / SIGNAL CLASSIFICATION LIBRARY MODEM CLASSIFIER**

HF	V/UHF
ALE 3G	ACARS-VHF
ALE 4G	APCO-25
CHN 4+4	APCO-25 Phase 2 Downlink
CHN MIL Hybrid 8FSK-PSK	DAB
CIS Akula 500Bd/1000Hz	DECT
CIS-45 OFDM (33Bd and 45 Bd)	DMR
CIS-60 OFDM (30Bd and 35.55Bd)	DMR Continuous
CIS-93 OFDM	dPMR
CIS-112 OFDM	D-STAR
CIS-128 OFDM 3kHz	DVB-T (8 MHz Mode only)
CODAN 3212 16 Channel PSK (includes CODAN 3012 variant)	Flex
HF DL	GSM (<3G), UMTS, LTE
LINK 11 (CLEW and SLEW)	INMARSAT IsatPhone Uplink
LINK 22	Iridium Uplink
MIL-STD-188-110A Serial (single tone) mode (a.k.a. STANAG 4539)	MPT1327
MIL-STD-188-110B/C App. C (a.k.a. STANAG 4539 HDR)	NXDN (2400 Bd and 4800 Bd)
MIL-STD-188-110C App. D	TETRA Downlink
PACTOR (I, II, II FEC, III, 4)	TETRA Uplink
STANAG 4285/4481 (PSK)	Tetrapol
STANAG 4529	Thuraya Uplink
STANAG 4539	VDL-2
	Yaesu System Fusion (including NB variant)

**go2MONITOR / SIGNAL CLASSIFICATION LIBRARY MEASURED MODULATION TYPE PARAMETERS**

Parameters	Description	OFDM	CARRIER	FSK	MFSK (FSKn)	MSK	CW	PSK	MCPSK	QAM	FM-PSK	ASK	MCFSK	Voice	FM Broadcast	Unknown
<b>Modulation</b>	Type of modulation and its quality	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>Pitch</b>	Pitch of the modulated voice													•		
<b>Type</b>	Type of voice like LSB, USB, AM, FM													•		
<b>Symbol rate</b>	Symbol rate in Bd	•		•	•	•		•	•	•	•	•	•			
<b>Order</b>	Number of phaseshifts / levels							•	•		•	•				
<b>Version</b>	Version of PSK A or B							•	•		•					
<b>CPM</b>	Transmitted characterper minute						•									
<b>Dash Dot Ratio</b>	Ratio between the length of dashes and dots						•									
<b>Shift</b>	Measured shift			•	•	•							•			
<b>Channel spacing</b>	Measured distance between channel in Hz	•							•				•			
<b>Frequency</b>	Center frequency of the signal	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Sub-carrier center frequency										•					
<b>Bandwidth</b>	Overall bandwidth of the signal	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Sub-carrier bandwidth										•					
<b>SNR</b>	Signal to noise ratio in dB	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>Signal time</b>	Time of measurement	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

\* A field that contains up to three detected QAM constellation details based on the soft decision result. Each comprises its corresponding constellation name, constellation ID, and detection quality. Optionally, it can also provide the respective constellation XML tags.

**go2MONITOR / SIGNAL CLASSIFICATION LIBRARY MEASURED MODULATION TYPE PARAMETERS**

Parameters	Description	OFDM	CARRIER	FSK	MFSK (FSKn)	MSK	CW	PSK	MCPSK	QAM	FM-PSK	ASK	MCFSK	Voice	FM Broadcast	Unknown
Number of tones				•	•											
Number of channels									•				•			
Constellation info										•*						

\* A field that contains up to three detected QAM constellation details based on the soft decision result. Each comprises its corresponding constellation name, constellation ID, and detection quality. Optionally, it can also provide the respective constellation XML tags.

go2MONITOR DEMODULATORS	
ALE 4G	OFDM
AM/A3E (Voice)	OQPSK
Analogue Selcal	Factor II, III, 4
ASK 2 (OOK), 4, 8	PSK 2, 4, 8, 16 A/B
Chirp	PSK data aided
Clover II	QAMn 16, 32, 36, 64, 128, 144, 256
Clover 2000	QAMn var: <ul style="list-style-type: none"> <li>• APSK16_dvbs2</li> <li>• ASK2PSK2 abs/diff</li> <li>• ASK2PSK4 abs/diff</li> <li>• ASK2PSK8 abs/diff</li> <li>• ASK2PSK16 diff</li> <li>• QAM 8</li> <li>• QAM 16 circle/square</li> <li>• QAM 16 v17 abs/diff</li> <li>• QAM 16 v22 abs/diff</li> <li>• QAM 32 circle</li> <li>• QAM 64 circle/square</li> <li>• QAM 256 square</li> </ul>
Clover 2500	
Coquelet	
DPSK 2, 4, 8, 16 A/B	
F1A	
FM/F3E (Voice)	
F7B/F7W	
FSK 2 matched	
FSK 2, 4, 8 disc.	
FSK 2,3 auto shift	
Hybrid	
J3E (USB, LSB) (Voice)	
LINK11*	
MDPSK 2, 4, 8, 16 A/B	
MCFSK 2	
Morse (A1A, A2A, F1A, F2A)	
MPSK 2, 4, 8, 16 A/B	Robust Packet
MSK/GMSK	TFM 3, 5
MT63	THROB / THROBX
MultiModem	Wideband HF (MIL 110 App.D) *
MultiTone (FSKn)	

\* requires optional product feature MIL decoder package



go2MONITOR Decryption*			
Decoder / Encryption type	Detection	Recognize Type	Decryption
<b>TETRA Downlink</b>			
TEA 1,3,4	•		key entered
TEA 2, end-to-end	•		
<b>TETRA Uplink</b>			
TEA 1,2,3,4	•	•	
end-to-end	•	•	
<b>TETRA DMO</b>			
TEA 1,3,4	•	•	key entered
TEA 2, end-to-end	•	•	
<b>DMR / DMR Continuous</b>			
Motorola Basic	•	•	automatic / key entered
Alinco	•	•	automatic / key entered
Hytera Basic	•	•	automatic / key entered (not continuous)
Kenwood Basic	•	•	
Enhanced/ARC4	•	•	key entered automatic key finding with go2key (optional)
Advanced encryptions (DES/AES)	•	•	key entered
<b>APCO-25, APCO-25 P2</b>			
ACCORDION 1.3	•	•	
BATON(Auto Even)	•	•	
FIREFLY Type 1	•	•	
MAYFLY Type 1	•	•	
SAVILLE	•	•	
BATON(Auto Odd)	•	•	
DES-OFB	•	•	
2-key triple DES	•	•	
3-key triple DES	•	•	
AES	•	•	
<b>NXDN</b>			
Basic Encryption (scrambled)	•	•	automatic / key entered
DES 64	•	•	
AES 128	•	•	
<b>DECT</b>			
Encryption	•	•	
<b>Tetrapol</b>			
Encryption	•	•	

\* requires optional product feature PMR decoder package

go2MONITOR SUPPORTED RECEIVERS						
Receiver	Max. Rx bandwidth*	Spectrum overview	Scan	Windows	Linux	Remark
<b>AirSpy</b>	8 MHz			•		Experimental support
<b>CommsAudit CA7851</b>	5 MHz			•	•	VITA 49, No receiver control, only VITA-49 wideband signal interface
<b>CommsAudit CA7852</b>	20 MHz			•	•	VITA 49
<b>Grintek GRX Lan</b>	1 MHz			•		
<b>IZT R3xxx series</b>	20 MHz	•	•	•	•	Up to 3 channels + spectrum
<b>IZT R4000 (SignalSuite)</b>	1 MHz			•	•	1 channel
<b>IZT R507x series</b>	60 MHz	•	•	•	•	
<b>narda® NRA-3000 RX</b>	320 kHz			•	•	
<b>narda® NRA-6000 RX</b>	320 kHz			•	•	
<b>narda® IDA 2</b>	320 kHz			•	•	
<b>narda® SignalShark® 3310</b>	20 MHz			•	•	VITA 49
<b>PLATH SIR 2110</b>	20 MHz			•	•	External receiver control. Fully functional driver available from the receiver manufacturer
<b>PLATH SIR 2115</b>	4x20 MHz			•	•	External receiver control. Fully functional driver available from the receiver manufacturer
<b>PLATH SIR 5110</b>	12 MHz			•	•	16x768 kHz subbands External receiver control
<b>PLATH SIR 5115</b>	Full HF			•	•	40x768 kHz subbands External receiver control
<b>R&amp;S EB 500</b>	2 MHz	•	•	•	•	

go2MONITOR SUPPORTED RECEIVERS						
	Max. Rx bandwidth*	Spectrum overview	Scan	Windows	Linux	Remark
<b>R&amp;S EB 510</b>	5 MHz	•	•	•	•	
<b>R&amp;S EM100/PR100</b>	500 kHz	•	•	•	•	
<b>R&amp;S EM200</b>	2 MHz	•	•	•	•	
<b>R&amp;S ESMD</b>	15 MHz	•	•	•	•	
<b>RFSPACE NetSDR</b>	1.6 MHz			•	•	
<b>RTLSDR/Noxon USB-sticks</b>	2.56 MHz			•		Experimental support. Continuous signal up to 2.4 MHz
<b>SDRplay RSP1 &amp; RSP2</b>	6 MHz			•		Experimental support
<b>SignalHound BB60C/D</b>	27 MHz	•	•	•	•	
<b>SignalHound SM200 A/B</b>	20 MHz	•	•	•	•	
<b>SignalHound SM200 C</b>	165 MHz	•	•	•	•	
<b>ThinkRF R5500-408</b>	6.25 MHz			•	•	VITA 49
<b>ThinkRF R5500-427</b>	6.25 MHz			•	•	VITA 49
<b>ThinkRF WSA5000-408</b>	780 kHz			•	•	VITA 49
<b>ThinkRF WSA5000-427</b>	780 kHz			•	•	VITA 49
<b>USRP X310</b>	20 MHz			•	•	Not Ubuntu Linux
<b>WiNRADiO G31DDC</b>	800 kHz			•		
<b>WiNRADiO G33DDC</b>	4 MHz	•		•		
<b>WiNRADiO G35DDC</b>	4 MHz	•		•		
<b>WiNRADiO G39DDC</b>	4 MHz	•		•		Up to 2 channels
<b>Generic VITA 49 receiver support</b>	Max. receiver bandwidth	•		•	•	Can be configured in a wide range for different receiver types
<b>Other generic „Winrad ExtIO“ supported receivers</b>	Max. receiver bandwidth			•		

\* Maximum bandwidth of the receiver. Maximum useable receiver input bandwidth in go2MONITOR depends on receivers streaming interface and the hardware performance.

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