WAVECOM®
NACHRICHTENTECHNIK

W-CODE

Standalone Software Solution for Signal Classification, De-coding, Analysis & Processing

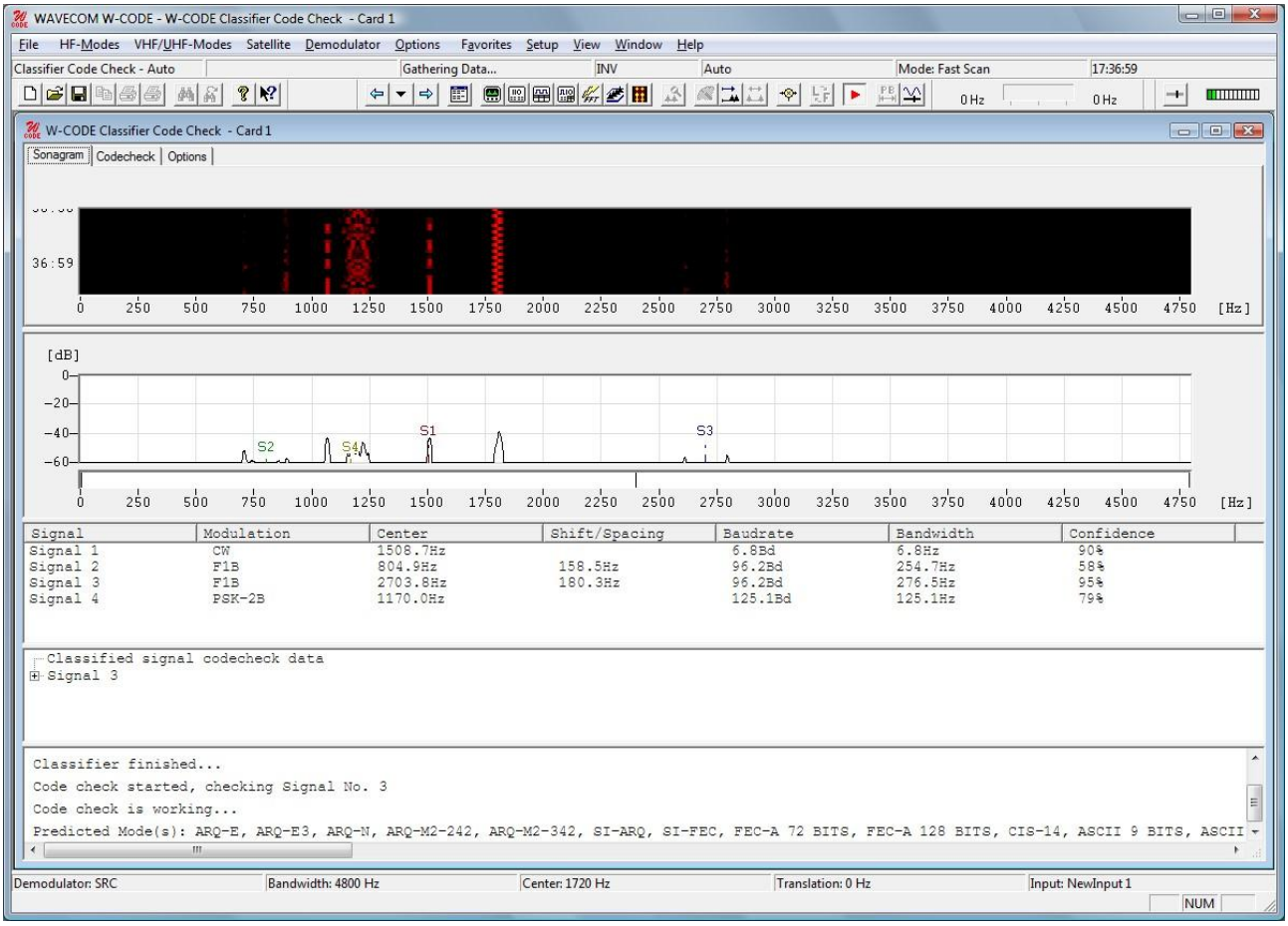


Figure 1 W-CODE with Classifier-Code-Check and multiple signals

W-CODE

W-CODE Overview

The W-CODE is the first "software-only" decoder in the well known WAVECOM® line of decoders.

The W-CODE software is designed to work with your existing equipment - no proprietary hardware required. It allows seamless integration with SDR (Software Defined Radio) receivers with IQ data or digital audio outputs, TCP/IP streams and sound cards.

One client license is provided with each software package (multiple licenses on request). W-CODE provides all functions required to analyze, decode and process radio data communications throughout the spectrum (HF, VHF, UHF, and SHF).

The W-CODE provides:

- An signal overview using real-time spectrum and waterfall display
- Demodulation, decoding to content level of known signals. Decoded output can be saved to files or picked up from the remote control interface
- Manual signal measurement
- Automatic classification and CodeCheck of unknown signals
- A versatile XML Remote Control Interface with the same command set used by the W51PC and the W61PC.

The COMINT Solution for:

- Government agencies
- Homeland and government security agencies, defense contractors
- Telecommunications authorities
- Defense signal corps

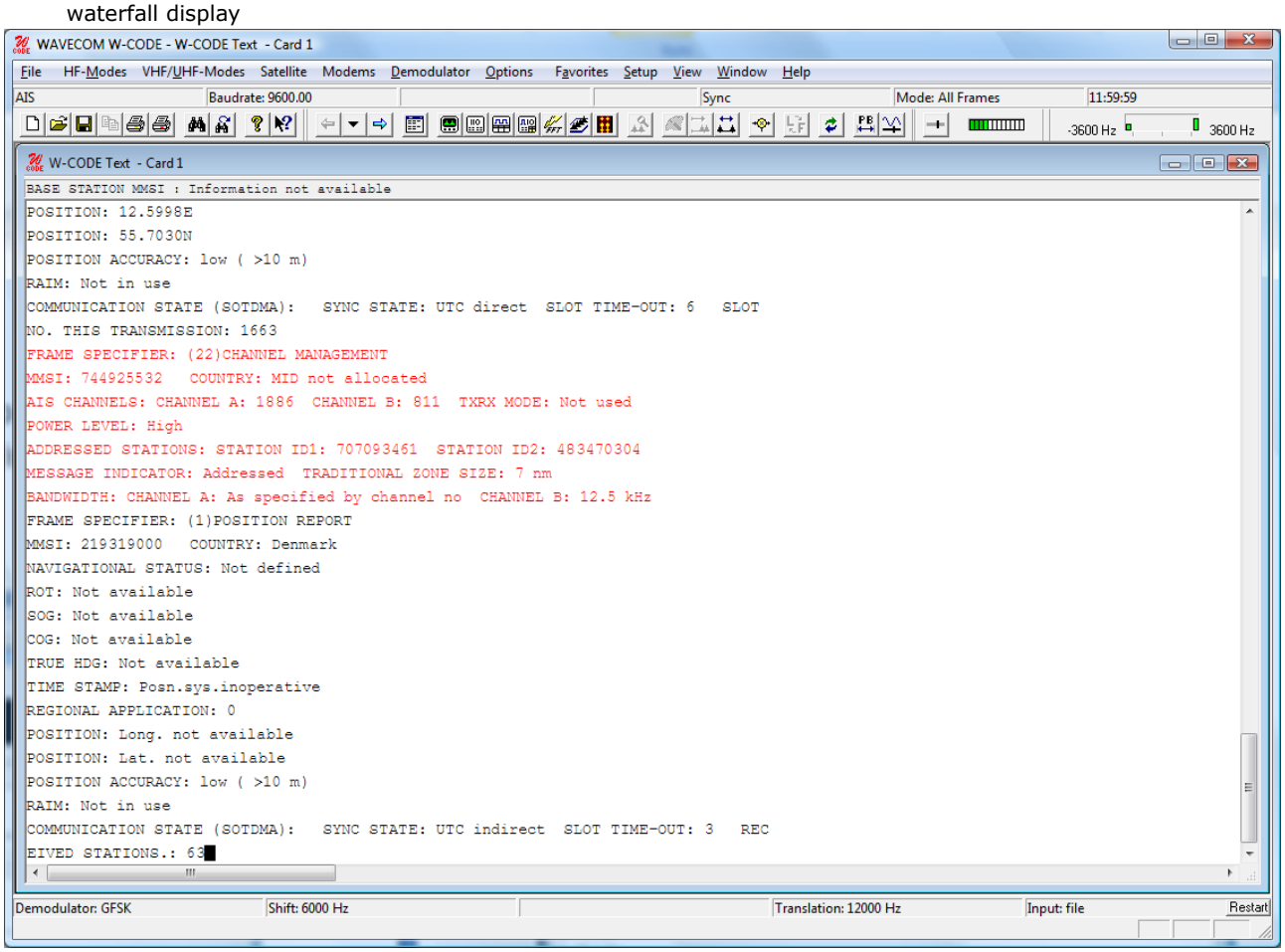


Figure 2 Decoding AIS from a 12 kHz IF file

Features

- TCP/IP data input (LAN) for IQ or PCM coded data. Data conversion to the WAVECOM format is done by a separate, external application. Source code available on request
- Decoding from PC soundcard with sampling rates up to 192 kHz
- Internal sampling rate converter
- Direct decoding from audio files
- Virtual Audio Cable (VAC) support
- Impressive list of currently implemented modes (see specifications), including:
  - ✓ INMARSAT
  - ✓ Robust-Packet-Radio
  - ✓ CLOVER2
  - ✓ CLOVER2000
  - ✓ PACTOR3
  - ✓ CODAN9001
- Powerful 48 and 96 kHz wideband FFT
- Adaptive Equalizer for high-speed PSK protocols
- Tested with a number of Software Defined Radios e.g. WiNRADiO, Perseus, SDR14/SDRIQ, AOR AR-ALPHA, R&S receivers (using AllAudio and VAC), IZT
- W-CONF, optional, external input device with two channels AF/IF (0.x-30) MHz and 70 MHz (52.5-87.5 MHz)
- XML Remote Control Interface with the same command set as the W51PC and W61PC
- Optional software classifier plug-in with 4 and 8 kHz bandwidth and FSK, MFSK, PKS, and OFDM support
- Pass band filters to mitigate poor propagation conditions or process wideband receiver input
- Worldwide support

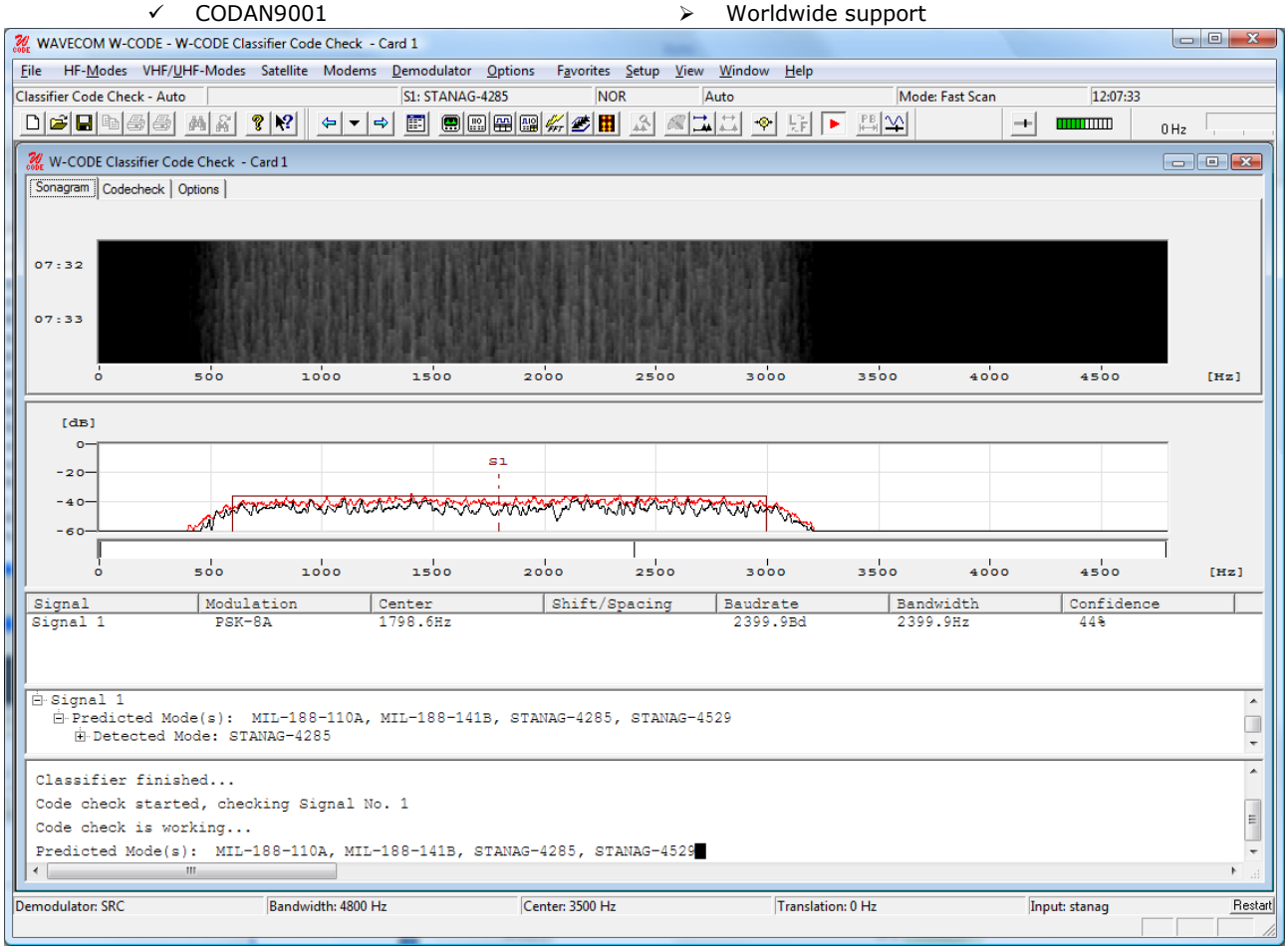


Figure 3 Classified STANAG 4285 signal

Functions

General

The easy-to-use graphical user interface (GUI) with well structured pull-down menus allows an operator to become familiar with the W-CODE in a short time. A high degree of operator proficiency can quickly be achieved.

The decoder can be used in a number of configurations:

- Local use as a PC application
- Remote use via a LAN with standard W-CODE application instances in a client-server mode
- Remote control from other applications using third party software (using TCP/IP and XML)

These features allow the system to be adapted to the client's requirements and applications.

The implementation of complex systems for monitoring on a large scale is only limited by the number of decoders and the performance of the hardware and software.

The configuration of the system components can be completely adapted to the requirements of the customer.

A wide range of system default settings can be configured, e.g., input signal level, measuring interval, centre frequency and demodulator type.

A W-CODE decoder may be controlled from everywhere in the network and its output may be sent to one or more applications on the network.

In order to process the data output, control the decoder and the code parameters, an integrated remote control interface allows easy control of the W-CODE from a customer application.

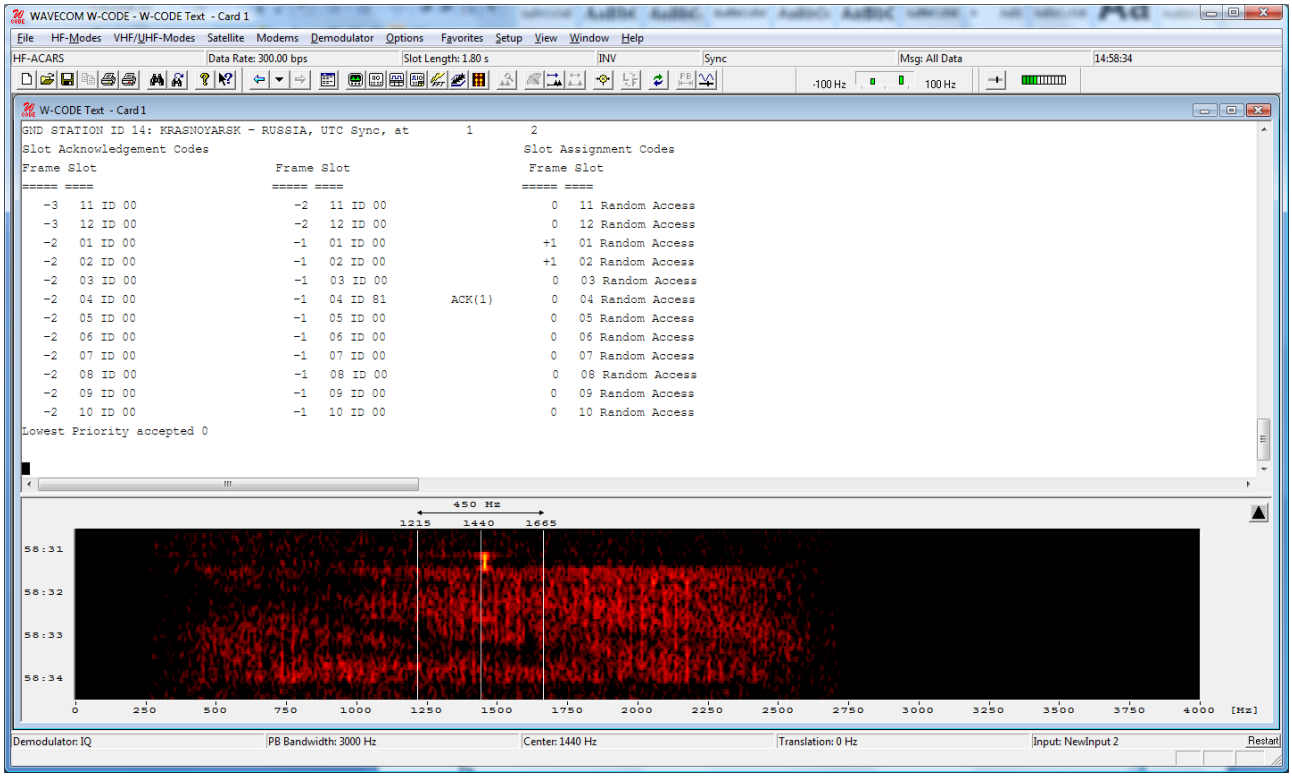


Figure 4 HF-DL/ARINC 635decoding

Analysis

The determination of signal characteristics is assisted by a large number of analysis and measurement functions operating over a wide range of signal parameters.

All of the integrated analysis tools contain many different methods and viewing options. The GUI assists the operator in analyzing the important signal parameters. Exact measurements are easily made using adjustable cursors with associated numerical displays. Dynamic zoom functions allow magnification of details in any selected window. The scroll buffering feature makes it possible to move back and forward in signal history.

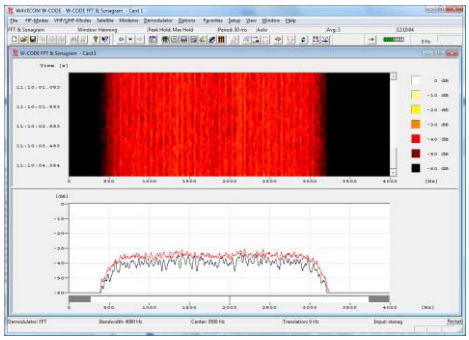


Figure 5 Spectrum (FFT/Sonagram)

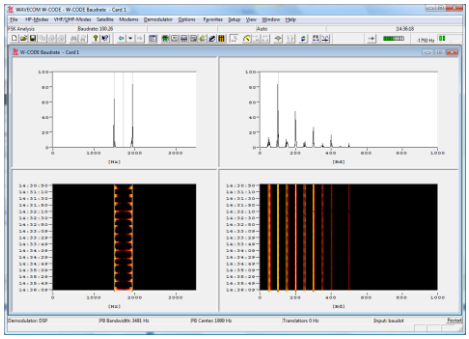


Figure 6 FSK-Analysis

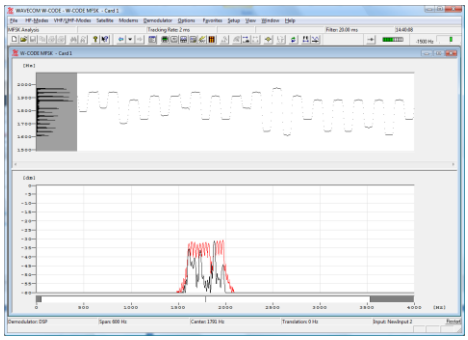


Figure 7 MFSK-Analysis

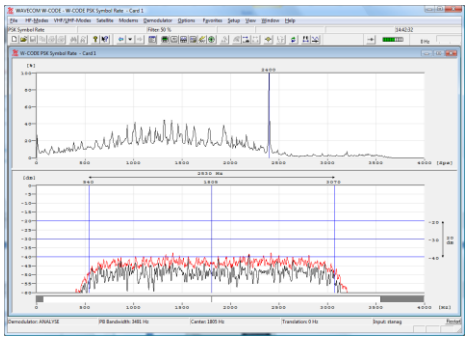


Figure 8 PSK-Symbolrate-Analysis

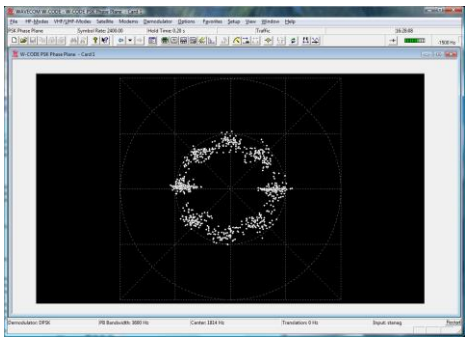


Figure 9 PSK-Phaseplane-Analysis

Demodulation and Decoding

If a decoder for a protocol is selected, then the demodulator can be tuned by the following ways:

- Automatically (for FSK)
- Manually
- Using the results from the classifier

Services

For authorized government agencies WAVECOM is able to provide:

- Additional customer specific modes
- Software source code and a complete development environment
- Training

Applications

Typical fields of applications for the WAVECOM decoders include:

- Manual or automated monitoring of radio data communications in the HF/VHF/UHF/SHF (satellite) bands
- Signal intelligence
- Signal analysis and classification

For government agencies, and telecommunications authorities, the applications range from stationary monitoring of one transmission with a single system to fully automated broadband monitoring employing many systems.

Decoded data can be imported from third-party applications running on the same or another computer in the network.

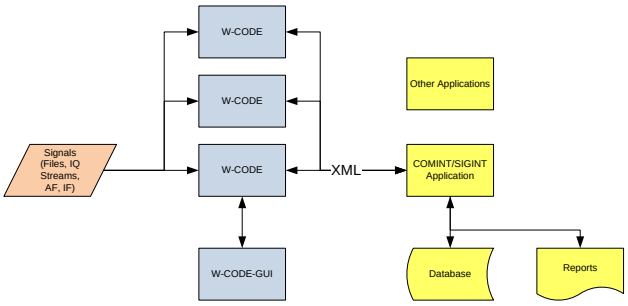


Figure 10 Decoding system with external control application

Software generated time stamps may be automatically added to each line of decoded data to ensure precise backtracking of any signal.

Classification (Option)

The ability to rapidly identify unknown signals has become an essential requirement in signal analysis.

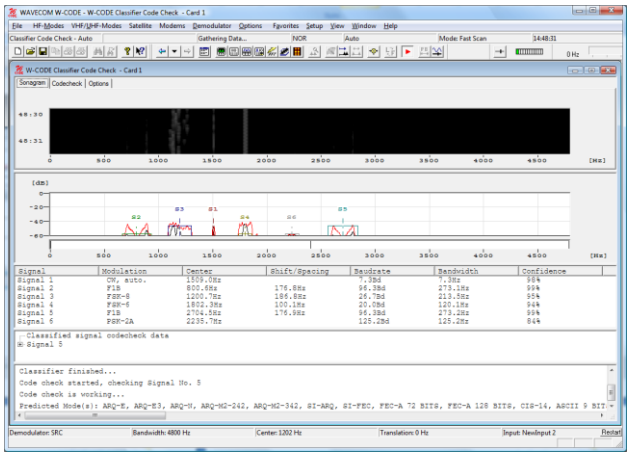


Figure 11 Spectrum, Classifier and Code-Check Windows

The automation of the signal classification process relieves the operator from manual evaluation, which otherwise requires considerable skills and experience. The combination of a classifier and a decoder thus satisfies the requirement for an automatic system that is able to rapidly and reliably determine the characteristics of radio data transmissions within the signal spectrum being monitored.

The classification algorithm determines the accurate center frequency, speed (symbol rate), shift, bandwidth and modulation.

The detection and classification results are displayed in a list together with all parameters and are fully integrated into the WAVECOM® user interface.

Classifier-Code-Check (CCC)

An FSK/PSK or MFSK code check of the classified signal is started to further determine the protocol of the signal. After the code check has completed, the classifier and code-check results are used to automatically parameterize the code and start decoding.

Spectrum display

In this pane the monitored frequency spectrum is displayed. After classification has completed the classified signals are indicated in the spectrum display.

Classification

The results of the classification are shown as a list in a second pane. The following parameters are provided for each classified signal:

- Modulation type
- Center frequency of the signal
- Number of carriers in the case of multi-carrier FSK
- Baud rate in the case of FSK or PSK signal
- Frequency shift in the case of FSK signal
- Bandwidth

Additional information

Additional graphical FSK, MFSK and PSK information on symbol timing and constellation, baud rate and frequency vs. time is displayed in a separate window when a classified signal is selected from the list.

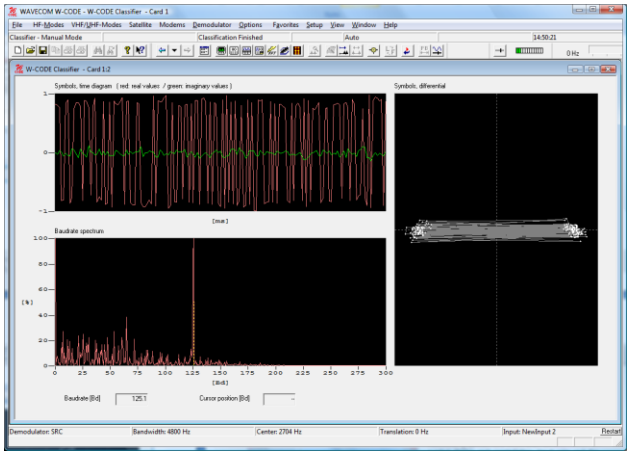


Figure 12 Classifier data analysis

Classified signals

For a list of classified signals, please see the section "Specification".

W-CODE-SAT (INMARSAT Option)

The W-CODE-SAT, together with the W-CONF hardware is the first choice to build a cost efficient satellite monitoring system for INMARSAT.

The user interface of the WAVECOM satellite modes is fully integrated as a software module in the existing hardware and professional software.

Additional functions are:

- Remote Control, to enable the customer to build his own customized system.
- INMARSAT B/M/mM, L-Band only, forward channel monitoring (does not require a large C-Band antenna).

INMARSAT B/M/mM

These modes offer video, data and fax service at different speeds.

The software monitors the control channel, and upon initiation of a new session with a mobile terminal, automatically switches to the assigned traffic channel for monitoring.

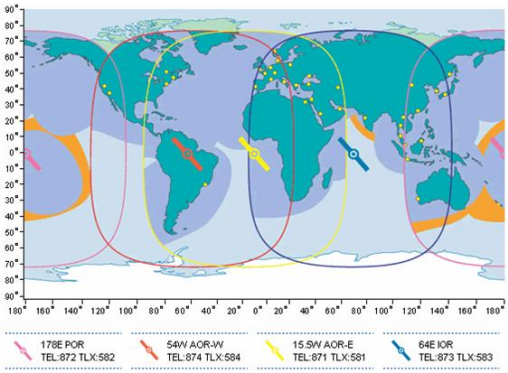


Figure 13 Satellite locations

To limit the volume of monitored traffic, a watch list may be created containing target MES IDs.

Monitored fax and data sessions are stored in files. A fax viewer is included in the software. INMARSAT B and M Voice are supported (mM on request).

INMARSAT B-C-TFC

SAT-B-C-TFC is used to monitor the return signal of SAT-B. This signal can be the uplink L-Band signal, or the downlink C-Band signal.

INMARSAT B-HSD

HSD (High Speed Data) Service using Inmarsat-B enables high-speed data communications between an INMARSAT terminal and a land-side ISDN terminal or between two Inmarsat terminals via 64 (56) kbps or 128 (112) kbps circuit.

INMARSAT C-TDM

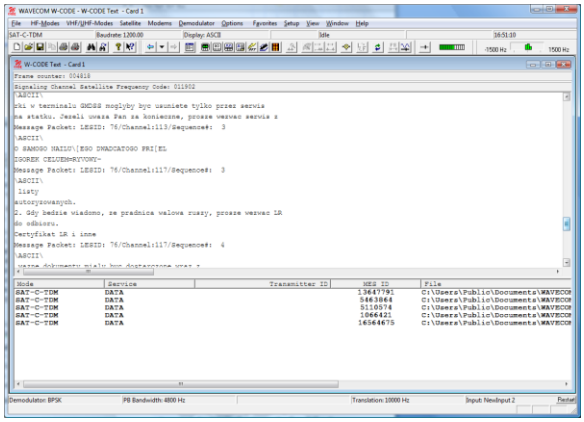


Figure 14 INMARSAT C-TDM traffic

INMARSAT C is a store-and-forward, low speed message transmission system. Currently it is one of the most reliable and most used systems for today's communication.

This is traffic going to the MES. Data output is in ASCII, HEX or Baudot.

INMARSAT-C-TDM-EGC

The INMARSAT C maritime mobile satellite system has an inherent capability, known as Enhanced Group Call (EGC), which allows broadcast messages to be made to selected groups of ship stations located anywhere within a satellite's coverage. Four geostationary satellites provide worldwide coverage for these types of broadcasts. Two types of EGC services are available: Safety NET and Fleet NET.

INMARSAT-C-TDMA

INMARSAT-C return channel traffic to the LES.

INMARSAT-AERO

The SAT-AERO system carries different services between aeronautical Ground Earth Stations (GES) and Aircraft Earth Stations (AES). At the moment only the P channel can be decoded.

System Requirements

The following items are required to monitor INMARSAT traffic:

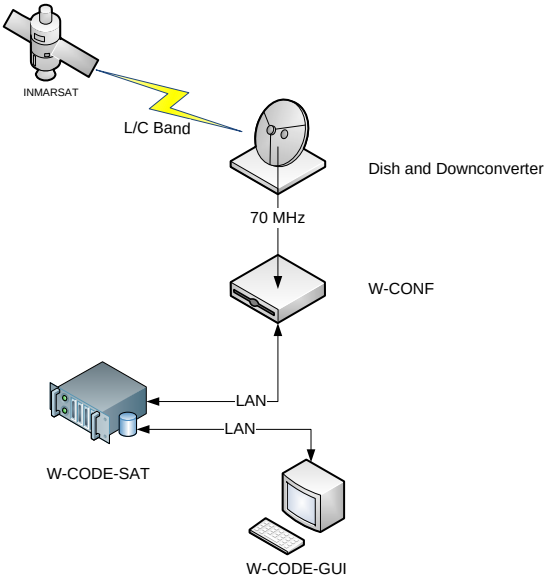


Figure 15 INMARSAT system

- Antenna (L- or C-Band)
- LNA or LNB
- Standard Down Converter to 70 MHz
- Computer(s)
- W-CONF interface(s) and W-CODE decoder(s) with W-CODE-SAT option

Easy-SAT-Control Software

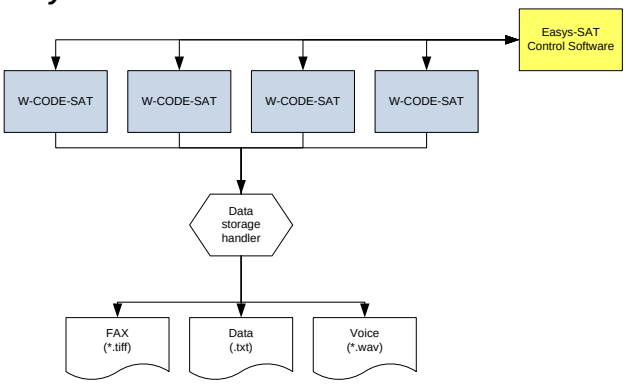
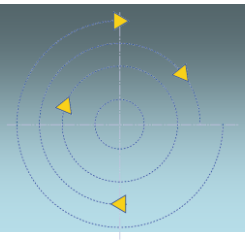


Figure 16, Easy-SAT-Control

As part of the INMARSAT software the Easy-SAT-Control software is include. It contains a small control application that allows multi channel monitoring of INMARSAT B/M/mM.



W-CODE Specification

	List of Abbreviations, Remarks
CC	CodeCheck
CL	HF-Classifier
*	Currently being developed
	Parameters depend on the selected code. The full parameter ranges can only be used, working with the source code
	Specifications may be changed without prior notice

HF-Protocols

HF-Protocols (will be expanded in the future)	CL	CC
ALF-RDS	✓	
ALIS		✓
ALIS-2		
ARQ6-90	✓	✓
ARQ6-98		✓
ARQ-E	✓	✓
ARQ-E3	✓	✓
ARQ-M2-242	✓	✓
ARQ-M2-342	✓	✓
ARQ-M4-242	✓	✓
ARQ-M4-342	✓	✓
ARQ-N	✓	✓
ASCII	✓	✓
AUM-13		
AUTOSPEC	✓	✓
BAUDOT	✓	✓
BULG-ASCII	✓	
CHU		
CIS-11	✓	✓
CIS-12 (HEX output)		
CIS-14	✓	✓
CIS-36		
CIS-36-50	✓	
CIS-50-50	✓	
CLOVER-2000 (ARQ)	✓	
CLOVER-II (ARQ)	✓	
CODAN (SELCAL)	✓	✓
CODAN9001		
COQUELET-13	✓	
COQUELET-8	✓	
COQUELET-80	✓	
CV-786	✓	
CW-MORSE	✓	
DCS SELCAL		✓
DGPS	✓	✓
DUP-ARQ	✓	✓
DUP-ARQ-2	✓	✓
DUP-FEC-2	✓	✓
EFR	✓	

WAVECOM®
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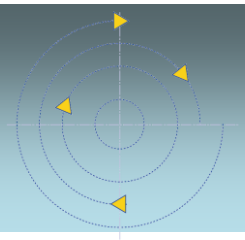
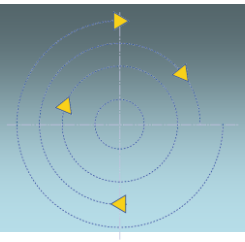


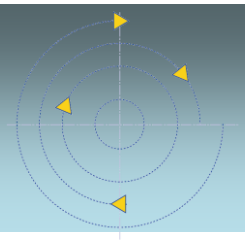
HF-Protocols (will be expanded in the future)	CL	CC
FEC-A	✓	✓
FELDHELL		
FM-HELL		
GMDSS/DSC-HF	✓	
G-TOR	✓	✓
GW-FSK	✓	✓
GW-PSK	✓	
HC-ARQ	✓	✓
HF-ACARS (HFDL)		
HNG-FEC	✓	✓
ICAO-SELCAL (ANNEX 10)		
MD-674	✓	
MFSK-16	✓	
MFSK-20		
MFSK-8	✓	
MIL-188-110-16TONE (-110A/B App. A)	✓	
MIL-188-110-39TONE (-110A/B App. B)		
MIL-188-110A, Serial Tones, 75-4800 bps	✓	
MIL-188-110B (App. C), STANAG 4539		
MIL-188-110B, 3200-12800 bps		
MIL-188-141A (ALE)	✓	
MIL-188-141B (BW0, BW1, BW4 data)		
MIL-188-141B (BW2 & BW3 id only)		
MIL-M-55529 NB/WB	✓	
OLIVIA	✓	
PACKET-300/600	✓	✓
PACTOR (all CRC's)	✓	✓
PACTOR-FEC (all CRC's)	✓	✓
PACTOR-II (all CRC's)	✓	
PACTOR-II-FEC (all CRC's)	✓	
PACTOR-III (all CRC's)	✓	
PICCOLO-MK12	✓	
PICCOLO-MK6	✓	
POL-ARQ	✓	✓
PRESS-FAX		
PSK-10		
PSK-125F	✓	
PSK-220F	✓	
PSK-31 (BPSK, QPSK)	✓	
PSK-31-FEC	✓	
PSK-63F	✓	
PSK-AM	✓	
ROBUST-PACKET-RADIO		
RUM-FEC	✓	✓
SI-ARQ	✓	
SI-AUTO	✓	
SI-FEC	✓	✓
SITOR-ARQ	✓	✓
SITOR-AUTO	✓	✓
SITOR-FEC	✓	✓
SP-14		
SPREAD-11	✓	✓



HF-Protocols (will be expanded in the future)	CL	CC
SPREAD-21	✓	✓
SPREAD-51	✓	✓
SSTV Automatic		
SSTV Martin 1, 2, 3 & 4		
SSTV Robot 8s, 12s, 24s & 36s		
SSTV SC-1 16 & 32s		
SSTV SC-1 8s, 16s & 32s		
SSTV Scottie 1, 2 , 3 & 4		
SSTV Wraase SC-1 24s, 48s & 96s		
SSTV Wraase SC-2 20s, 60s, 120s & 180s		
STANAG 4285 75-3600 bps	✓	
STANAG 4415 75 bps (NATO ROBUST)		
STANAG 4481-FSK (KG-84)	✓	
STANAG 4481-PSK		
STANAG 4529 75-1800 bps		
STANAG 4539 3200-12800 bps		
SWED-ARQ	✓	✓
TWINPLEX ARQ		
VISEL		
WEATHER-FAX		

VHF/UHF-Protocols

VHF/UHF-Protocols (will be expanded in the future)	CC
ACARS	
AIS	
ASCII	✓
ATIS (Selcal Digital)	
BIIS	
CCITT (Selcal Analog)	
CTCSS (Selcal Analog)	
DCS SELCAL	✓
DGPS	✓
DTMF (Selcal Analog)	
DZVEI (Selcal Analog)	
EEA (Selcal Analog)	
EIA (Selcal Analog)	
ERMES	
EURO (Selcal Analog)	
FLEX	✓
FMS-BOS (Selcal Digital)	
GMDSS/DSC-VHF/UHF	
GOLAY	✓
MOBITEX-1200 (with partial OVLS extension)	
MOBITEX-8000	
MODAT (Selcal Analog)	
MPT-1327	
NATEL (Selcal Analog)	
NMT-450	
NWR-SAME	
PACKET-1200	✓
PACKET-9600	



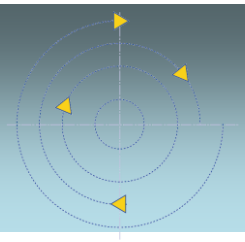
VHF/UHF-Protocols (will be expanded in the future)	CC
PCCIR (Selcal Analog)	
PDZVEI (Selcal Analog)	
POCSAG	✓
PZVEI (Selcal Analog)	✓
SKYPER (POCSAG)	
VDEW (Selcal Analog)	
ZVEI-1 (Selcal Analog)	
ZVEI-2 (Selcal Analog)	
ZVEI-3 (Selcal Analog)	
ZVEI-VDEW (Selcal Digital)	

SAT-Protocols

SAT Protocols (will be expanded in the future)
AMSAT-P3-D
METEOSAT
NOAA-GEOSAT
SAT-AERO (Aero-I), Beta Version
SAT-A-TELEX
SAT-B/M/mM (INMARSAT™, return)*
SAT-B-C-TFC (INMARSAT™, C-Band return fixed ch)
SAT-B-Data (INMARSAT™, forward)
SAT-B-FAX (INMARSAT™, forward)
SAT-B-HSD (INMARSAT™, forward, High Speed Data)
SAT-B-TEL (INMARSAT™, forward)
SAT-B-TELEX-MM (INMARSAT™, forward)
SAT-B-TELEX-SM (INMARSAT™, forward)
SAT-C-EGC (INMARSAT™, Enhanced Group Calls)
SAT-C-TDM (INMARSAT™)
SAT-C-TDMA (INMARSAT™)
SAT-M-DATA (INMARSAT™, forward)
SAT-M-FAX (INMARSAT™, forward)
SAT-mM-DATA(INMARSAT™, forward)
SAT-mM-FAX(INMARSAT™, forward)
SAT-mM-TEL (INMARSAT™, forward) ask
SAT-M-TEL (INMARSAT™, forward)

FAX and Modem Protocols

FAX and Modem Protocols
FAX-G3 T4 / T6 / JPEG / JBIG T.30 protocol with ECMM
V.22, ITU-T
V.22bi,s ITU-T
V.32bis, ITU-T
V.34, ITU-T
V.42A, HDLC framing, MNP4, MNP5 Protocol
V.42bis, HDLC framing, MNP4, MNP5 Protocol
V.8, ITU-T
V.90, ITU-T *
V.92, ITU-T *

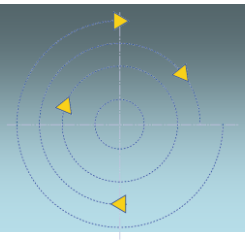


List of Alphabet

List of Alphabets
Chinese (7Bit ASCII)
HEX
ITA-1 Latin
ITA-2 Baghdad70 Arabic
ITA-2 Baghdad80 Arabic
ITA-2 Cyrillic
ITA-2 Danish-Norwegian
ITA-2 Hebrew
ITA-2 Latin
ITA-2 Latin Transparent
ITA-2 Swedish
ITA-2 TASS Cyrillic
ITA-2 Third Shift Cyrillic
ITA-2 Third Shift Greek
ITA-5 Bulgarian
ITA-5 Danish-Norwegian
ITA-5 French
ITA-5 German
ITA-5 Swedish
ITA-5 US
Morse Arabic
Morse Cyrillic
Morse Greek
Morse Hebrew
Morse Latin
Morse Scandinavian
Morse Spanish
User defined 5-bit Alphabets based on UNICODE

Demodulator

Demodulators (Biterror rate within 3 dB of theory (white Gaussian noise, non fading channel))
AM for METEOSAT and NOAA-GEOASAT FAX transmissions
BPSK, 10-12000 symbols/s
BR6028 Modem, 7 FDM channels S 85 Hz, Pilot-Tone 561 Hz
CTCSS
CW Morse, 10-500 WPM, Center freq. 0.5 kHz-3.5 kHz, BW 100 Hz-1.2 kHz
DPSK, DBPSK, DQPSK, D8PSK, D16PSK, 10-12000 symbols/s
DTMF
DXPSK, dual carrier adaptive modulation, 2DPSK-D16PSK, 100 Baud
FFSK, 10-12000 Baud, Shift 50 Hz-16 kHz
FSK, 10-2400 Baud, Shift 50 Hz-3.5 kHz, Center freq. 0.5 kHz-3.5 kHz
GFSK, 10-12000 Baud, Shift 50 Hz-16 kHz
ITU-T , V.34 HDX*, V.17, V.19*, V.29, V.27ter, V.21 ch2*, V.8 for Modems and FAX-G3
Mark-Space FSK, 10-300 Baud, Shift 50 Hz-3.5 kHz, Center freq. 0.5 kHz-3.5 kHz
MFSK, Tone length 4-1000 ms / max. 64 Tones, Shift 50 Hz-3.5 kHz
OQPSK, 10-12000 symbols/s
QPSK, 10-12000 symbols/s
Software AM/ FM Demodulator for IF Inputs



Analysis Functions

Analysis Functions
Autocorrelation up to 200’000 bits
Automatic analysis & decoding software for all data and FAX-G3 modulations
Automatic CRC recognition of all PACTOR-II and PACTRO-II-FEC systems
Bit correlation analysis. Raw FSK analysis: Graphical display of demodulated data on a raster time line. For visual recognition of character and block lengths.
Bit length analysis. Graphical display of demodulated data, with automatic calculation of bit length with bit pattern display
Code check for FSK codes
FSK analysis
Manual measurement of the frequency shift(s) with movable cursors
MFSK analysis for HF: Graphical display of MFSK tones with histogram.
Oscilloscope, real time, resolution up to 200 us/div
Phase plane display, HF, VHF/UHF Indirect BPSK, QPSK, OQPSK DPSK, 25-2400 Baud
Phase plane display, VHF/UHF Direct BPSK, DPSK, QPSK, OQPSK, 100-12000 Baud
Real-time FFT, averaging: 1-64 values, bandwidth 0.5, 1, 2, 4, 24, 48 kHz & 96 kHz and adjustable cursors, 20 frames/sec
Sonagram, real time display with cursor functions and history (full scrolling)
Symbol rate HF, VHF/UHF Indirect, Analysis 30-4000 Baud
Symbol rate VHF/UHF Direct, Analysis 30-24000 Baud
Scroll back buffers for text and graphic modes
VHF/UHF Selcal analysis: Graphical display of FSK data for Selcal signal analysis.
Waterfall, real time display with cursor functions

General Software Characteristics

General Software Characteristics
ALARM MONITOR, automatic detected text-string saving to HD or LAN, SMS output
Automatic insertion of time stamps
Bitstream: raw, synchronized FSK bitstream available through remote control interface.
Bitstream: raw, synchronized none adaptive PSK bitstream available through remote control interface.
File formats: TXT, BMP, Unicode, WAVECOM (with timestamps)
FSK baudrate history display with full graphical recall / averaging and cursor functions
FSK shift history display with graphical recall/averaging, cursor functions
Message type for most MIL-STD and STANAG codes (sync/async, data bits, parity bits, stop bits, MSB/LSB, ITA2/ITA5(ASCII)/HEX/STANAG5066
Pass-band filters in most codes
Pass-band tuning in FFT display in most codes
SERIAL LINK, serial data output over COM1-16 with
Sound card input, 16bit, 48 kHz, Stereo
STANAG5066 parser in MIL-STD and STANAG codes
TCP/IP direct data interface for digital receivers (SDR), ask for the WAVECOM TCP/IP data exchange protocol
TCP/IP Remote Control with WAVECOM GUI, full functionality over LAN/Internet (encrypted and speed optimized)
Unlimited scroll back buffers for text and graphic modes
Up to 8 decoders/computer
USB-License-Dongle
Virtual Audio Cable (VAC) support
WAV files playback and decoding, loop mode
XML Remote Control (API for C++ and C#, XML over TCP/IP)

Hardware System

Hardware/System	
Concept	Software only solution
Sound card input: maximum sampling rate	192 kHz
Sound card sampling rate precision	<5 ppm, 1ppm recommended
TCP/IP IQ data Input	Ask
Screen Resolution (SVGA)	min. 800x600
Minimum CPU requirements	P4,1.6 GHz
Minimum RAM requirements	512 MB
OS WINDOWS XP/VISTA 32-bit	Tested with English version

W-CODE-CL (HF Classifier Option)

W-CODE-CL Classifier Option (each option requires a separate license)	
Classification Bandwidth	4 kHz or 8 kHz
Classification Sample Time	1.6 or 3.2 sec
Classified signals:	CW FSK-2: Modulation index: 0.5-20; shift: 25-2000 Hz; speed 25-2500 Baud F7B: shift: 25-2000 Hz; speed 25-300 Baud MFSK: Max. 34 carriers, 25-300 Baud PSK2/4/8/16, A&B: speed 25-2400 Baud; S/N=16 db, using a non-cooperative equalizer OQPSK: speed 25-2400 Baud OFDM: shift>25Hz; max. 500 channels; subcarrier spacing/symbol rate range 1.1-2.5 Accuracy: FSK speed: 0.3 % FSK center frequency: 2% of speed PSK-speed: 0.2 % PSK center frequency: 0.15 % of speed Sensitivity of classification FSK-2: m=0.8: 100-2400 Baud, S/N=12 dB FSK-2: m=0.8: 50-100 Baud, S/N=15 dB PSK2/4: 100-2400 Baud S/N=14 dB PSK8: 100-2400 Baud S/N=16 dB,
Operating	Display of classified signals in FFT Continuous mode for HF-classifier (CCC) Integrated classifier-code-check

W-CODE-SAT (INMARSAT Option)

SAT INMARSAT Option (each option requires a separate license)
SAT-A /B/C/M/mM, details see code table
W-CODE-SAT requires an external receiver and interface for the IF.
Single channel INMARSAT C/B/M/mM Monitoring System, with FAX/Voice/Data File-Recording, FAX-Viewer for B/M/mM, B Voice-Playback. External receiver and interface required.

CLOVER2000 (Option)

CLOVER2000 Option (each option requires a separate license)	
System	Half-duplex ARQ
Center frequency	−3000 to 3000 Hz
AFC	+/−50 Hz
Speed	62.5 Baud
Modulation	PSK2A, PSK4A, PSK8A, PSK16A, ASK2PSK8, ASK4PSK16, 2DPSK2A; 8 tones
Alphabet	ITA-5

CLOVER2 (Option)

CLOVER2 Option (each option requires a separate license)	
System	Half-duplex ARQ
Center frequency	−3750 to 3750 Hz
AFC	+/−50 Hz
Speed	31.25 Baud
Modulation	PSK2A, PSK4A, PSK8A, PSK16A, ASK2PSK8, ASK4PSK16, 2DPSK2A; 8 tones
Alphabet	ITA-5

PACTOR3 (Option)

PACTOR3 Option (each option requires a separate license)	
System	Half-duplex synchronous ARQ
Center frequency:	−2900 to 2900 Hz
AFC	+/-50Hz
Speed	100.0 Baud
Modulation	DBPSK, DQPSK; 2, 6, 14, 16, or 18 tones
Alphabet	ITA-5 with block coding, CRC is displayed

CODAN9001 (Option)

CODAN9001 Option (each option requires a separate license)	
System	Half-duplex asynchronous adaptive ARQ
Center frequency	−3100 to 3100 Hz
AFC	+/−8 Hz
Speed	16 x 75 Baud
Modulation	Differential PSK4A; 16 tones
Alphabet	ITA-5 with block coding, CRC is displayed

Ordering Information

Ordering Information	
Documentation	English User Manual
Online Help	English
Software	Installation CD with latest software version and WAV signal samples
Updates	Software update by CD or Internet http://www.wavecom.ch
Source Code	As an option, only available to official government bodies only, against a written certificate
Warranty	2 years

For more information contact your local dealer or WAVECOM ELEKTRONIK AG.
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