GW-OFDM Global Network

Advanced Protocols

WAVECOM
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GW-OFDM Overview

The last twenty years have seen the general demise of coastal wireless services in the MF and HF frequency bands and most stations have been closed down, while the few remaining mainly serve the Global Maritime Distress and Safety System. However, one HF system has shown considerable growth, and that is the global network (the Maritime Data Network, see fig. 1) of 24HF coastal radio stations owned or operated by Globe Wireless, a US based private company. Its globally located coastal stations are connected by leased lines to two, redundant network operation centers in Liverpool, UK and San Francisco, USA. The company offers fully automatic HF and satellite systems to more than 4,000 vessels worldwide. The equipment and applications (email, ship security alert, vessel tracking etc.) are Globe Wireless property, are installed and maintained by the company and its operation does not require skilled personnel. Software and firmware updates can be automatically downloaded and installed using OTA (Over-The-Air) programming. The following graph, taken from the ITU-presentation "Globe Wireless New HF/MF Digital Maritime Mobile Systems", shows the global HF network.

Globe Wireless Maritime Data Network

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GW-OFDM History

Globe Wireless started its operations using 100 Baud SITOR FSK links, later on switched to 200 Baud half-duplex FSK and DQPSK and D8PSK phase modulated system and has now moved on to Orthogonal Frequency Division Multiplexing (OFDM) - a modulation format which has gained foothold in recent years in response to increasing demands for bandwidth and robustness in hostile environments, e.g. HF.

GW-OFDM Specifics

The Globe Wireless implementation of OFDM employs a variant characterized by dynamically reducing or increasing the number of subcarriers to adapt to the widely varying propagation conditions in the HF bands. Furthermore ARQ is in use as well as different types of data compression. The system operates in a fixed time grid. GW-OFDM is using long packets containing data and short packets containing control or request information for the ARQ process. The Information Sending Station (ISS) sends the data on a different frequency as the Information Receiving Station (IRS) sends its requests. That means that on one frequency either data or requests can be decoded. A scrambler is used for reducing the peak-to-average-power ratio characteristic for OFDM-systems.

GW-OFDM Main Parameters

The main parameters of the GW-OFDM variant are:

- 12 to 32 subcarriers
- DQPSK modulation
- 62.5 Hz subcarrier spacing (symbol duration 16 ms)
- guard interval duration 2 ms
- 700-2700 Hz occupied bandwidth
- Pilot tone for synchronization and frequency tracking

The system is fully automatic transmitting idle channel signals in robust FSK on numerous channels across all HF bands from transmitters scattered across all continents thus covering all time zones. Potential receivers listen for these signals and determines based on the reception quality which HF channels to use.

The operation of the system is very much similar to the operation of the older SITOR system. At the initialization of a session - sessions are half-duplex - the Information Sending Station (ISS) will indicate to the Information Receiving Station (IRS) using a robust modulation type (FSK) which modulation format it wishes to employ. After a link has been established the process switches to OFDM. Normally the link is controlled by the ISS, but the IRS may force the link to the opposite direction or even terminate it by sending the appropriate control signals.

A "Least-Cost-Routing" feature will ensure that large files are routed via a satellite link if available.

GW-OFDM Implementation

The WAVECOM implementation of the GW-OFDM-decoder consists of an OFDM demodulator using the pilot tone for frequency tracking and synchronization. The GW-OFDM-specific ARQ protocol is handled by the decoder. Repeated packets are used for correcting previous wrong received packets. All variants of the data compression can be handled.

Decoded traffic is displayed in the decoded data window as well as saved to a file, which can be retrieved for later in-depth analysis. The decoder will display status information on call signs, MMSI identification and type of compression. Due to the ARQ protocol and the compression, decoded data is not until the end of transmission available. The Decoder can recognize normal and inverse polarity.

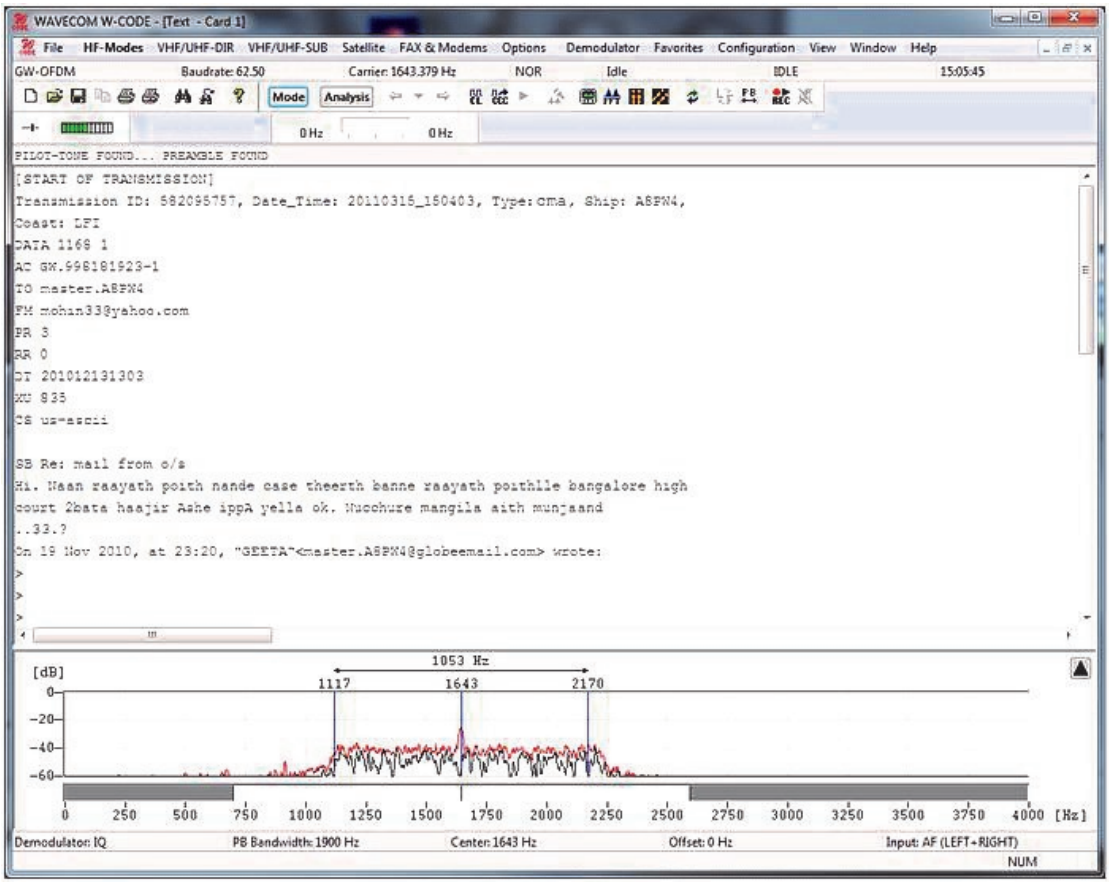

Fig. 2 W-CODE Screenshot

Since more than thirty years Wavecom Elektronik AG has developed, manufactured and distributed high quality devices and software for the decoding and retrieval of information from wireless data communication in all frequency bands. The nature of the data communication may be arbitrary, but commonly contains text, images and voice. The company is internationally established within this industry and maintains a longstanding, world-wide network of distributors and business partners.

Product Information

Products	http://www.wavecom.ch/product-summary.php
Datasheets	http://www.wavecom.ch/brochures.php
Specifications	http://www.wavecom.ch/product-specifications.php
Documentation	http://www.wavecom.ch/manuals.php
Online help	http://www.wavecom.ch/content/ext/DecoderOnlineHelp/default.htm
Software warranty	One year free releases and bug fixes, update by DVD
Hardware warranty	Two years hardware warranty
Prices	http://www.wavecom.ch/contact-us.php

System Requirements

	Minimum	*Recommended*
CPU	Core i5 or Core i7 2.8 GHz	Core i7-6700 3.4 GHz
Memory	4 - 8 GB RAM	16 - 32 GB RAM
OS	Windows 7	Windows 10 32-bit or 64-bit

Distributors and Regional Contacts

You will find a list of distributors and regional contacts at http://www.wavecom.ch/distributors.php

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