Analog and digital modulation pdf

Process to change one or more properties of a periodic waveform For other uses see Modulation (disambiguation page). This article may be too technical for most readers to understand. Please help improve to make it understandable to non-experts without removing technical details. (February 2017) (Learn how and when to delete this message template) Passband modulation Analog modulation AM FM PM QAM SSB Digital modulation ASK APSK CPM FSK MFSK MSK OOK PPM PSK QAM SC-FDE TCM WDM Hierarchical modulation QAM WDM Spread spectrum CSS DS SSS FHSS THSS See also Capaciting Demodulation Line Coding Modem Anm PoM PAM PCM PDM PWM ΔΣM OFDM FDM Multiplexing vte Modulation used by singers and other singers to adjust the characteristics of their voices , such as volume or spacing. Modulation is also a technical term for expressing the multiplication of the original signal by another, usually regular, signal. In electronics and telecommunications, modulation is a process of changing one or more properties of a periodic waveform called a carrier signal with a modulation signal, which usually contains the information to be transmitted. The term analog or digital modulation is used when the modulation signal is analog or digital. Most radio systems in the 20th century have been used to use radio systems. Most, if not all, modern transmission systems use QAM (Quadrature Amplitude Modulation), which alters the amplitude and the carrier signal phase. Because a modulation signal is a bit sequence or stream, i.e. a digital modulation signal, the term digital modulation is used. However, it should be stressed that usually the bit sequence must be converted to an analog signal before modulating (multiplying) the carrier signal. In music production, modulation is a process of gradual change of sound characteristics in order to reproduce the sense of movement and depth of audio recordings. Includes the use of a source signal (known as a modulator) to control another signal (carrier) through various sound effects and synthesis methods. [1] Modulator is a modulation device. Demodulator (sometimes detector or demod) is a device that performs demodulation, inverse modulation. The modem (from the demodulator modulator) can perform both operations. The aim of analogue modulation is to transmit the analogue signal of the base band (or lowpass), such as an audio signal or tv signal, through an analog bandpass channel with a different frequency, for example through a limited radio frequency band or a cable tv network channel. The aim of digital modulation is to transmit digital bit-stream through an analogue communication channel, for example via a public switched telephone network (where the bandpass filter limits the frequency range to 300-3400 Hz) or through a limited radio frequency band. Analog and modulation facilitates multiplex frequency separation (FDM), where several low-channel information signals are transmitted simultaneously via the same common physical medium using separate passband channels (several different carrier frequencies). Digital base band modulation methods, also known as line encoding, aim to transfer digital bitte flow through a basic channel, usually unfiltered copper wire, such as serial bus or local area network. Pulse modulation methods aim to transmit narrowband analog signals, such as a phone call over a broadband base channel or, in some diagrams, as bitstream through another digital transmission system. Analog modulation methods Low frequency signal messages (above) can transmit am or fm radio waves. Waterfall plot of radio carrier with a frequency of 146,52 MHz with amplitude modulation of 1 000 Hz sinusoids. Two strong lateral bands at + and - 1 kHz from the carrier frequency are displayed. Carrier, frequency modulated by 1000 Hz sinusoidals. The modulation index has been adjusted to approximately 2.4, so the carrier frequency has a small amplitude. Several strong sidebands are obvious; In principle an infinite number are produced in FM, but higher-order sidebands are negligible in size. In analog modulation, modulation is applied continuously in response to an analog information signal. Common analog modulation techniques include: Amplitude modulation (AM) (here the amplitude of the carrier signal varies in accordance with the instantaneous amplitude of the modulating signal) Modulation of the bilateral band (DSB) Modulation of the double lateral band with the carrier (DSB-WC) (used in the AM radio broadcasting band) Dual band transmission with printed transmission (DSB-SC) Dual band reduced carrier transmission (DSB-RC) Modulation of single-sided band (SSB, or SSB-AM) Single-sided modulation with carrier (SSB-WC) Modulation of single-sided modulation of the vehicle suppressed (SSB-SC) Vestigial sideband modulation (VSB or VSB-AM) Modulation of quadrature amplitude (QAM) Angle modulation , which is approximately a constant envelope Frequency modulation (FM) (here the frequency of the carrier signal changes in accordance with the instantaneous amplitude of the modulating signal) Phase modulation (PM) (here the phase shift of the carrier signal changes in accordance with the instantaneous amplitude of the modulating signal) Transposition modulation (TM) in which the inflection of the waveform changes, which leads to a signal in which each quarter of the cycle is transposed into the modulation process. TM is a pseudo-analog modulation (AM). If the AM carrier also carries a phase variable phase f(1). TM is f(AM,1) Digital modulation methods In digital modulation, the analog carrier signal is modulated by a discrete signal. Digital modulation methods can be considered as digital analog conversion and corresponding demodulation or detection as analogue to digital conversion. Changes in the carrier the final number of alternative M symbols (modulation alphabet). Schema 4 baud, 8 bit /s data connection containing arbitrarily selected values. A simple example: A phone line is designed to transmit audio sounds, such as tones, and not digital bits (nols and those). However, computers can communicate over a phone line using modems that represent digital bits with tones called symbols. If there are four alternate symbols (corresponding to a musical instrument that can generate four different tones one at a time), the first symbol can be a bit sequence of 00, the second 01, the third 10, and the fourth 11. If your modem plays a tune of 1,000 tones per second, the symbol speed is 1,000 symbols per second or 1,000 baud. Because each tone (that is, symbol) is a message consisting of two digital bits in this example, the bit rate is twice the symbol speed, i.e. 2000 bits per second. According to one definition of a digital signal, the modulated signal is a digital signal. By a different definition, modulation is digital for analog conversion. Most textbooks would consider digital modulation schemes to be a form of digital transmission synonymous with data transmission; very little would consider this to be analogue transmission. Basic digital modulation methods The most basic digital modulation techniques are based on keying: PSK (phase keying): the final number of phases is used. FSK (frequency shift keying): the final number of frequencies is used. ASK (amplitude-shift keying): the final number of amplitudes are used. QAM (quadrature amplitude modulation): the final number of at least two phases and at least two amplitudes shall be used. In QAM, the infusion signal (or I, one example being cosine waveform) and the quadrature phase signal (or Q, with sinusoidal wave as an example) are modulated with the final number of amplitudes and then added together. It can be seen as a two-channel system, each channel using ASK. The resulting signal is equivalent to a combination of PSK and ASK. In all of the above methods, each of these phases, frequencies, or amplitudes are assigned a unique pattern of binary bits. Typically, each phase, frequency, or amplitude encodes the same number of bits. This number of bits contains a symbol that is represented by a specific phase, frequency, or amplitude. If the alphabet consists of alternate symbols M = 2 N {\displaystyle M=2^{N}}, each symbol represents a message consisting of n bits. If the measure of symbols (also known as baud rate) f S {\displaystyle f_{S}} symbols per second (or baud), the data speed is N f S {\displaystyle Nf_{S}} bit per second. For example, with an alphabet consisting of 16 alternate symbols, each symbol represents 4 bits. This means that the data speed is four times the bit rate. In the case of PSK, ASK or QAM, where the carrier frequency of the modulated signal is constant, the modulation alphabet is often represented on the constellation diagram showing the signal amplitude I on the x-axis and the amplitude of the Q signal on the y-axis for each symbol. Modulator and detector principles of OPERATION PSK and ASK, and sometimes FSK, are often generated and detected using the QAM principle. Signals I and Q can be combined into a complex I+jQ signal (where j is an imaginary unit). The resulting so-called equivalent lowpass signal or equivalent base band signal is a comprehensively valued representation of a reasonably prized modulated physical signal (so-called passband signal or RF signal). These are the general steps that the modulator uses to transfer data: Group incoming data bits into code words, one for each symbol that will be transferred. Assign code words to attributes such as signal amplitudes I and Q (equivalent low pass signal) or frequency or phase values. Customize pulse shaping or other filtering to reduce bandwidth and create a spectrum equivalent to a low-mount signal, usually using digital signal processing. Perform digital to analog conversion (DAC) of I and Q signals (as of today, all of the above are usually achieved through digital signal processing, DSP). Generate a high frequency sine carrier waveform, and possibly a cosine quadrature component. For example, perform modulation by multiplying the sinusoidal and cosine waveform by signals I and Q, resulting in the equivalent low-mount signal being shifted to a modulated passband signal or RF signal. This is sometimes achieved by DSP technology, such as direct digital synthesis using a wavetable instead of analog signal processing. In this case, that DAC step should be performed after this step. Reinforcement and analog filtering of strips to avoid harmonic distortion and periodic spectrum. On the receiver side, the demodulator usually performs: Bandpass filtering. Automatic profit control, AGC (to compensate for attenuation, such as fading). Rf signal frequency shifts to equivalent base band I and Q signals or to a mean frequency (IF) signal by multiplying the RF signal by the local sinusation wave oscillator and the frequency of the cosine waves (see superheterodyne receiver principle). Sampling and analogue to digital conversion (ADC) (sometimes before or instead of the above point, for example through insufficient sampling). Equal filtering, such as matching filter, compensation for multiplication of multiple strips, time propagation, phase distortion, and selective fading of frequency to prevent intersymbolic interference and symbol distortion. Detection of signal amplitudes I and Q or frequency or phase of IF signal. Quantification of amplitudes, frequencies or phases with the closest permitted symbol values. Mapping quantified amplitudes, frequencies, or phases by code words (bit groups). Parallel-to-serial conversion of code words into a bit of a stream. resulting result for further processing, such as deleting any error correction codes. As is common for all digital communication systems, both modulator and demodulator design must be carried out simultaneously. Digital modulation schemes are possible because a pair of transmitters and receivers have a prior knowledge of how data is encoded and represented in the communication system. In all digital communication systems, both the transmitter modulator and the demodulator on the receiver are structured to perform inverse operations. Asynchronous methods do not require a signal of the reference clock of the receiver, which is phase synchronized with the signal of the sender. In this case, the modulation symbols (and not bits, characters, or data packets) are transmitted asynchronously. The opposite is synchronous modulation. Zoznam bežných techník digitálnej modulácie Najbežnejšie techniky digitálnej modulácie sú: Phase-shift keying (PSK) Binary PSK (BPSK), používajúc M=2 symboly Quadrature PSK (QPSK), používajúc symboly M=4 8PSK, používajúce symboly M=8 16PSK, použitie M = 16 symbolov Diferenciál PSK (DPSK) Diferenciál QPSK (DQPSK) Offset QPSK (OQPSK) π/4-QPSK Frekvenčný posun kľúčovanie (FSK) Audio frekvencia-shift keying (AFSK) Multi-frekvencia posun kľúča (M-ary FSK alebo MFSK) Dual-tón multi-frekvencia multi-frekvencia (DTMF) Amplitúda-shift kľúčing (ASK) On-off kľúčovanie (OOK), najbežnejšie ASK forma M-ary vestigial sideband modulácia, napríklad 8VSB Quadrature amplitúda modulácia (QAM), kombinácia PSK a ASK Polárna modulácia ako QAM kombinácia PSK a ASK [citácie potrebné] Kontinuálna fáza modulácie (CTZ) metódy Minimálne-shift kľúčovanie (MSK) Gaussian minimum-shift kľúčovanie (GMSK) Kontinuálne-fáza frekvenčný posun kľúčovanie (CPFSK) Ortogonálne frekvenčné delenie multiplexing (OFDM) modulácia Diskrétny multitón (DMT) , including adaptive modulation and bit modulation Lattice wave modulation encoded modulation (TCM), also known as Trellis modulation Spectral Techniques Direct Sequence Spectrum Propagation (DSSS) Chirp Spectrum Propagation (CSS) by IEE 2 802.15.4a CSS uses pseudosastic coding Spectrum of propagation of frequency hopping (FHSS) applies a specific scheme for channel release MSK and GMSK are specific cases of continuous phase modulation. MSK is in fact a specific case of a CPM subset known as continuous frequency phase shift (CPFSK) keying, defined by a rectangular frequency pulse (i.e. a linearly increasing phase pulse) with a single symbol and time duration (signalling the overall response). OFDM is based on the idea of a multiplex frequency division (FDM), but multiplex currents are part of one original stream. The bit flow is divided into several parallel data streams, each of which is transmitted through its own subinherator using some conventional digital modulation scheme. Modulated sub-carriers are summed up to form an OFDM signal. This division and recombination helps to manipulate channel failures. OFDM is considered more of a modulating because it transmits one bit stream through one communication channel using a single sequence of so-called ofdm symbols. OFDM can be extended to multi-user channel access method in orthogonal frequency-multiple access division (OFDMA) and multi-carrier code division multiple access (MC-CDMA) systems that allow multiple users to share the same physical media by giving different sub-carriers or spreading codes to different users. Of the two types of RF amplifiers, switching amplifiers (Class D amplifiers) cost less and use less battery power than linear amplifiers of the same output power. However, they only work with relatively constant amplitude-modulating signals such as angular modulation (FSK or PSK) and CDMA, but not with QAM and OFDM. However, although switching amplifiers are completely unsuitable for normal QAM constellations, often QAM modulation principle are used to power switching amplifiers with these FM and other waveforms, and sometimes QAM demodulators are used to receive signals to extinguish these switching amplifiers. Automatic digital modulation recognition (ADMR) Automatic recognition of digital modulation in intelligent communication systems is one of the most important issues in software defined by radio and cognitive radio. According to the incremental size of smart receivers, automatic modulation recognition is becoming a challenging topic in telecommunications systems and computer engineering. Such systems have many civilian and military applications. In addition, blind modulation type recognition is an important problem in commercial systems, especially in software defined radio. Usually in these systems, there are some additional information for system configuration, but due to blind approaches in smart receivers, we can reduce information overload and increase transmission performance. [3] It is clear that without knowledge of the transmitted data and many unknown parameters in the receiver, such as signal performance, carrier frequency and phase shifts, timing information, etc., blind modulation identification is quite difficult. It becomes even more challenging in real-world scenarios with multipath fading, frequency-selective and time-changing channels. [4] There are two main approaches to automatic modulation recognition. The first approach uses probability-based methods to assign an input signal to the correct class. Another recent approach is based on feature extraction. Basic band digital modulation or barcode Main article: Barcode The term basic band digital modulation (or digital baseband transmission) is synonymous with barcodes. These are methods of transmitting the digital bitstream through the analogue channel of the base band (aka lowpass channel) using a pulse train, i.e. a discrete number of signal levels, direct voltage or current modulation on a cable or serial bus. Common examples are unipolar inversion coding (AMI) without returning to zero (NRZ), Manchester and inversion marks (AMI). [5] Pulse Pulse Pulse modulation schemes are aimed at transmitting a narrowband analogue signal through an analogue base channel as a two-level signal by pulse wave modulation. Some impulse modulation systems also allow the transmission of a narrowband analogue signal as a digital signal (i.e. as a quantified discrete time signal) at a fixed bit rate that can be transmitted through a basic digital transmission system, such as some barcode. They are not modulation schemes in the conventional sense because they are not channel encoding systems, but should be considered as resource encoding schemes and in some cases as analogue to digital conversion techniques. Analog Methods Pulse Amplitude Modulation (PAM) Pulse Width Modulation (PWM) and Pulse Depth Modulation (PDM) Pulse Position Modulation (PPM) Analog through

Digital Methods Pulse Code Modulation (PCM) Differential PCM (DPCM) Adaptive DPCM (ADPCM) Delta Modulation (DM or Δ modulation) Delta-sigma modulation (∑Δ) Modulation of continuously variable inclination delta (CVSDM), also called Adaptive Delta Modulation Modulation (ADM) Pulse Density Modulation (PDM) Various modulation techniques Use on-off keying to transmit Morse code at radio frequencies is known as continuous wave operation (CW). Adaptive modulation Space modulation is a method by which signals are modulating in airspace, such as a signal used in instrument landing systems. See also Wikimedia Commons has media related to modulation. Channel Access Methods Channel Coding Codec Communication Channel Demodulation Electrical Resonance Heterodyne Barcode Mechanically Induced Modulation Modem Modulation Order Neuromodulation RF Modulator Ring Modulation Telecommunications Types of Radio Emission Reference This article needs additional citations for verification. Please help improve this article by adding quotes to reliable sources. Non-source material can be challenged and removed. Find Resources: Modulation - News · newspapers · books · scholar · JSTOR (June 2008) (Learn how and when to delete this template message) ^ Rory PQ (May 8, 2019). What is modulation and how to improve your music. Collective icon. Renewed August 23rd, 2020. ^ Modulation methods | Electronics basics | ROHM. www.rohm.com. In 2020-05-15. ^ Valipour, M. Hadi; Homayounpour, M. Mehdi; Mehralian, M. Amin (2012). Automatic recognition of digital modulation in the presence of noise using SVM and PSO. 6. International Symposium on Telecommunications (TIS). p. 378 - 382. doi:10.1109/ISTEL.2012.6483016. ISBN 978-1-4673-2073-3. ^ Okay, Octavia A., Ali Abdi, Yeheskel Bar-Ness and Wei Su. Communication, IET 1, No 2 (2007): 137-156. (2007). Exploration of automatic modulation techniques: classic approaches and new trends (PDFs). IET communication. 1 (2): 137–156. doi:10.1049/iet-com:20050176.CS1 maint: multiple names: list of authors (link) ^ Ke-Lin Du & M. N. Swamy (2010). Wireless communication systems: From RF subsystems to 4G support University press. p. 188. ISBN 978-0-521-11403-5. Further reading Multipliers vs Modulators Analog Dialogue, June 2013 External Links Interactive presentation soft-demapping for AWGN-channel in web-demo Institute of Telecommunications, University of Stuttgart Modem (Modulation and Demodulation) Obtained from 2Modulation method used by the American standard ATSC digital TV This article is about the method of modulation of television television. For SBE certification, see Certified 8-VSB specialist. 8VSB is a modulation method used for broadcasting in the atsc digital television standard. ATSC and 8VSB modulation is mainly used in North America; On the contrary, the DVB-T standard uses COFDM. The modulation method determines how a radio signal fluctuates to transmit information. ATSC and DVB-T specify the modulation used for a flat-screen digital TELEVISION; for comparison, QAM is the modulation method used for cable. The specifications for cable television can therefore indicate that it supports 8VSB (for broadcasting television) and QAM (for cable TELEVISION). 8VSB is an 8-level vestigial modulation of side straps. Essentially converts a binary stream into an octal representation by amplitude shift of the sinus carrier keying to one of eight levels. 8VSB is capable of transmitting three bits (23=8) per symbol; in the ATSC, each symbol contains two bits of MPEG traffic stream, which are lattice modulated to form a three-bit character. The resulting signal is then filtered with an nyquist filter to remove the release in the side lobes and then move to the frequency of transmission. [1] Vestigial sideband modulation (VSB) modulation technique is a modulation method that seeks to eliminate spectral redundancy of pulsed amplitude modulation (PAM) signals. Modulation of the carrier by a real sequence of data results in a frequency of totality and difference, resulting in two symmetric lateral bands of the carrier. Symmetry means that one of the side straps is redundant, so removing one side strip still allows demolition. Because zero-bandwidth filters cannot be implemented, the implemented filtering leaves the remnants of an extra lateral band, i.e. the name VSB. 6 MHz (megahertz) throughput used for ATSC broadcasts, 8VSB carries a symbol speed of 10.76 megabaud, a gross bit rate of 32 Mbit/s, and a net bit rate of 19.39 Mbit/s of usable data. The net bit rate is lower due to the addition of forward error correction codes. Eight signal levels are selected using encoder bars. Similar modulations of 2VSB, 4VSB and 16VSB are also available. 16VSB was intended primarily for use for ATSC digital cable, but quadrature amplitude modulation (QAM) has instead become a de facto industry standard because it is cheap and easily accessible. Advantages of energy saving[doubtful – discussing] The important advantage of 8VSB for broadcasters is that it requires much less energy to cover comparable to the area of the previous NTSC system and is reportedly better than the most common alternative COFDM system. The advantage includes a lower ratio of maximum and average power required compared to COFDM. The 8VSB transmitter shall have a peak power capability of 6 db (four times) of its average power. 8VSB is also more resistant to impulse noise. Some stations may cover the same area during transmission at an efficient radiated power of approximately 25% of the analogue transmission power. While NTSC and most other analog TV systems also use vestigial sideband technique, unwanted sideband is filtered much more efficiently in ATSC 8VSB transmissions. 8VSB uses a nyquist filter to achieve this goal. Reed-Solomon Error Fix is the primary system that is used to maintain data integrity. In summer 2005, the ATSC published standards for extended VSB or E-VSB [1]. By correcting errors up front, the E-VSB standard will allow DTV reception on low power handheld receivers with smaller antennas in much the same way DVB-H does in Europe, but still uses 8VSB transmission. Disputes concerning the use of ATSC For a certain period of time, there has been an ongoing lobby for the change of ATSC modulation to COFDM, the way DVB-T is transmitted in Europe and ISDB-T in Japan. However, the FCC has always held that the 8VSB is better modulation for use in digital TV broadcasting in the US. In a 1999 report, the Commission found that 8VSB has a better noise transmission threshold or performance (C/N), has a higher data transmission capability, requires less transmitter power for equivalent coverage and is more resilient to impulse and phase noise. [2] Consequently, in 2000 it rejected a petition for rule-making from Sinclair Broadcast Group requesting that broadcasters be able to choose between 8VSB or COFDM, which is best suited to their coverage area. [3] The FCC report also acknowledged that COFDM would generally be expected to work better in situations where there is a dynamic multipath, such as mobile traffic or in the presence of trees that move in strong winds. However, with the introduction of fifth generation demodulators in 2005 and subsequent improvements to generations 6 and 7, the settlement margin is now approximately -60 to +75 microseconds (135 microseconds) and virtually eliminates multipath, static and dynamic, at 8VSB reception. By comparison, the balancing margin in COFDM is −100 to +100 microseconds (200 microsecond spreads), but the use of this much buffer zone space for COFDM substantially reduces its payload. In fact, much of Europe has adopted 1280×720p as hd standard for DVB-T1 due to reduced payload capacity[quote needed]. The introduction of DVB-T2 is intended to increase the ability of terrestrial transmissions to transmit content 1920×1080p. 1920×1080i has always been part of the 8VSB scheme since its inception, and its improved demodulators have had no effect on its innate payload necessary]. Due to the continued adoption of the 8VSB-based ATSC standard in the U.S., and the large growing ATSC receiver population, switching to COFDM is now essentially impossible. Most analog terrestrial transmissions in the U.S. were turned off in June 2009 and 8VSB tuners are common to all new TVs, which further complicates the future transition to COFDM. 8VSB vs. COFDM The previously cited FCC report also found that COFDM has improved performance in dynamic and high static multipath situations and offers benefits for single frequency networks and mobile reception. However, in 2001, a technical report compiled by the COFDM Technical Group concluded that COFDM does not offer any significant advantages over 8VSB. Finally, the report recommends that receivers are connected to outdoor antennas raised to approximately 30 feet (9 meters) in height. Neither 8VSB nor COFDM performs acceptablely in most indoor test facilities. [4] However, there were questions [who?] whether the COFDM receiver selected for these tests – the transmitter monitor [2] lacks normal front-end filtering – color these results. Repeated tests that were conducted using the same COFDM receivers with the addition of a front-end band pass filter gave much better results for the DVB-T receiver, but further testing was not performed. [3] [permanent dead link] Discussion of 8VSB versus COFDM modulation is still ongoing. Proponents of COFDM argue that it resists multipath much better than 8VSB. This is an important feature of modulation for receiving HDTV eg moving vehicles that is not possible with 8VSB. Soon 8VSB DTV (digital television) receivers often had problems receiving signals in urban environments. Newer 8VSB receivers, however, are better at dealing with multipath, but a moving receiver still cannot receive a signal. In addition, 8VSB modulation requires less power to transmit the signal at the same distance. In less populated areas, 8VSB can therefore overcome COFDM. However, in some urban areas, as well as for mobile use, COFDM can offer a better income than 8VSB. Several improved VSB systems have been in development, in particular E-VSB, A-VSB and MPH. Flaws in 8VSB when it comes to receiving multipath can be addressed by using other forward error-correcting codes that reduces useful bit rate, such as using ATSC-M/H for mobile/pocket reception. ATSC 3.0, another major television standard in the United States, will use COFDM. The vast majority of U.S. television stations use COFDM for their studio's transmitter links and news gathering operations [citations needed]. These are point-to-point communication links and not broadcasts. See also ATSC Tuner ATSC-M/H for Mobile/Handheld Receiver Reference ^ Sparano, David (1997). WHAT EXACTLY IS 8-VSB ANYWAY? (PDF). November 8, 2012. ^ DTV REPORT ON COFDM AND 8-VSB PERFORMANCE (PDF), FCC Office of Engineering and Technology, archived (PDF) from the original 14th 30 September 1999. ^ Sinclair claims broad support for DTV petitions, Television Digest with Consumer Electronics, 1999, archived from the original on 2004-09-02, obtained 2008-06-06, October 11, 1999. ^ 8VSB/COFDM Comparison Report Archived 2005-11-22 on Wayback Machine External Links What exactly is 8-VSB anyway? DVB-T signal is encoded orthaginal frequency divisional multiplex system or COFDM for short, but so is cable (DVB-C) and satellite (DVB-S). Dvb-T signal is implemented as QPSK QAM or Quadrature Phase Shift Keying and Quadrature Amplitude Modulation.The DVB-S signal is implemented as QPSK QFM or Quadrature Phase Shift ShiftIng Quadrature Frequency Modulation. The DVB-C signal is QPM QAM or Quadrature phase Modulation Quadrature Amplitude Modulation. Obtained from