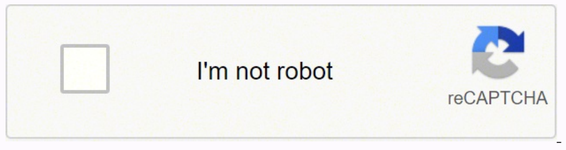

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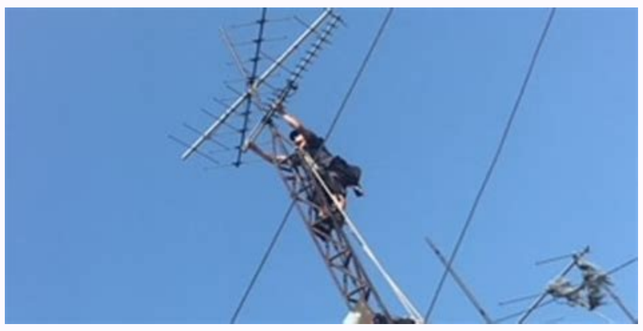

Tuner for digital TV channels³ This article needs additional quotes for verification ³ n. Please help improve this article by adding quotes to reliable sources. Unused material can be challenged and removed.Find sources:Ã "ATSC tuner"Ã Â Ã news Ã Â· periÃ dics Ã Â· booksÃ· acadÃ© micoÃ Â· JSTOR (November 2019) (Learn how and how to remove this template message) Multiple MPEG programs are combined and sent to a broadcast antenna. In the U.S. digital broadcast television system³n³ an ATSC receiver decodes the TS and displays it on a TV. An ATSC (Advanced Television Systems Committee) tuner, often referred to as an ATSC receiver or HDTV tuner, is a type of television tuner³ which enables the reception ³ of digital ³ (DTV) channels that use ATSC standards, as transmitted by TV stations ³ North America, parts of Central America and South Korea. Such tuners are usually integrated into a TV, VCR, digital video recorder (DVR) or set-top box that provides audio/video output connectors of various types.[citation required] Another type of TV tunerÃ ³ n is a digital ³ (DTA) TV adapter with an analogÃ ³.[citation required] Description ³ n tÃ© terms "tuner" and "receiver" are used imprecisely, and it is perhaps more appropriate to call it an ATSC receiver, being the tuner part of the receiver (see Metonimia). The receiver generates the audio and video (AV) signals necessary for television³ and performs the following tasks: demodulation³ error correction³; MPEG transport stream demultiplexing; decompression³ n; AV synchronization³ and reformatting media to match what is an optimal input ³ the TV. Some examples of media reformatting are: intertwined to progressive exploration ³ vice versa; image resolutions; aspect ratio conversions ³ (16:9 to or from 4:3); conversion ³ frame rate; and scaling of imgenes. The zoom is an example of changing ³ resolution. It is usually used to convert a low resolution image ³ a high resolution display³ n. This allows the user to remove the ³ format or the pillarboxing format when stretching or cropping the image. Some ATSC receivers, mostly HDTV TV receivers, are automatically stretched, either by detecting black bars or reading the active format descriptor (AFD).[citation required] Operation ³ An ATSC tuner works by generating audio and video signals that are captured from the television³ on-air³ n. ATSC tuners provide the following functions: selective adjustment; demodulation³ demultiplexing of transport flows; decompression³ n; error correction³; conversion³ from ³ channel to digital; AV synchronization³ Selective tuning Selective tuning ³ the process by which a receiver selects the radio frequency (RF) of the television channel ³ from a band of transmitted RF signals. Selective tuning ³ the process by which a receiver selects the radio frequency (RF) of the television channel³ The tuner usually performs the frequency selection function³ together with the rejection of unwanted out³band signals.[citation required] DemodulaciÃ n "DemodulaciÃ ³ n" means transforming the tuner's signal into a seÃ±a that a TV can use to produce images and sound regardless of how often it is transmitted. It is the separation ³ a baseband base-band base station from the RF carrier that is used to transmit it through the air (or by a coaxial cable or other long-distance medium). ATSC, as implemented in the US, uses n 8VSB modulation³ which requires less power to transmit, as opposed to COFDM modulation ³ also proposed (used in European DVB-T, which is less prone to distortion³ routes and, therefore, better received in more ³ facilities).[citation required] Transport flow In the U.S., multiple digital channels are combined and then transmitted from an antenna source to create through the transmissions. Through the reverse process (demultiplexing), an ATSC receiver first receives the combined MPEG transport stream and then decodes it to display one of its various components on a TV.[citation required] Since digital packets that are spread through the air are compressed (packed smaller), once received by the ATSC tuner, these compressed digital data packets are decompressed (unpacked to their original size). The ATSC system uses compressionÃ n with pÃ© ³, so, although the size of the uncompressed data is the same as the size of the original compressed data, the data produced are not exactly the same as the original data entered into the system at the transmission siteÃ ³ n, but it is close enough that most people do not notice a difference.[citation required] CorrecciÃ n ³ errors CorrecciÃ ³ n of errors is a technology that uses the ATSC tuner to make sure that any that is missing can be corrected. For example, sometimes an interference or poor quality is causing the loss of some data that the ATSC tuner receives. With the error correction³ the tuner has the ability to perform a series of checks and repair data so that one can be seen on a TV. The error correction ³ works by providing additional information ³ the seÃ±al before the transmission³ which can be used at the reception ³ fill in the gaps. Therefore, error correction has ³ opposite effect of compressionÃ ³ nÃ Â increases the amount of data that is transmitted, instead of reducing it as compressionÃ³ n does, and improves the quality and robustness of the seÃ±al instead of reducing it. Compression ³ n eliminates redundant (and some non-redundant) data, while error ³ adds some redundant data. The reason ³ error correction is used instead of ³ using less compression³ and maintaining the redundancy that already exists is that error correction systems are specially designed to get the most benefit from a very small amount of redundant data, while the natural redundancy of the data does not do this work so efficiently, so with the correction³ n of errors the net amount of data needed is even less.[quote needed] The test Nadal ATSC (ATSC-E) has a sub³section that allows broadcasters to add additional bug fixes (and variable types) to their broadcast transmissions. This error correction service ³ not mandatory in the United States, nor in Canada. It is not known how many HDTV receivers support this ³ error correction standard. For the transmission ³ HDTV to 720 or 1080, an additional 1% or 3% of cÃ ³ error correction codes will helpÃÃÃÃÃÃÃÃ ³ reduce some of ATSC's worst performance withÃ±ales dÃobile under multiple adverse path conditions. Reception³n is considerably reduced due to EMI in the short wave to VHF and UHF bandwidth of nearby computers of all types [light], WiFi portÃ til and broadband Internet [medium to strong], microwave ovens [explode while activated], cell phones and towers with which they communicate, and even power lines with unique electronic³ transmissions. AV Synchronization AV synchronization ³ the coordination ³ the audio and video signals that are displayed on a digital TV in an appropriate time. AV synchronization ensures that audio is not delayed ³ the video displayed on the TV or vice versa, so that both audio and video are synchronized.[citation required] Image reformatting Media reformatting is extremely important because the format of images on TVs differs significantly depending on the technology used. For example, some TVs have an interlaced image, while others have a progressive scan ³. The different televisions have a different-looking relationship.[citation required] Mandates of the United States government Main article: Transition ³ digital television³ in the United The FCC has issued the following mandates for devices entering the United States:[1][2][3] By July 1, 2005, all TVs with 36-inch (91 cm) screens must include a built-in ATSC DTV tuner. By March 1, 2006, all TVs with screens larger than 64 cm (25 inches) must include a built-in ATSC DTV tuner. By March 1, 2007, all TVs, regardless of screen size, and all interface devices that include a tuner (VCR, DVD player/recorder, DVR) must include an integrated ATSC DTV tuner. Devices manufactured before these can still be sold without a built-in ATSC DTV tuner; the lack of digital tuners legally must be disclosed to consumers and most trademark retailers have incurred FCC penalties for non-compliance with these requirements[4]. The current regulations are specified in the United States Code ³ of Federal Regulations (CFR).[5] AnalÃ ³gic TV transmissionÃ ³ n switch For low-power TV stations, see TransiciÃ n³ n³ n digital TV in the United States. In early 2006, the US Deficit Reduction Act of 2005[6] was ³ into law, which calls for full-power air³n television stations to cease their analogÃ ³ gica broadcasts by February 17, 2009[7] (this cut-off date has been amended several times previously). On February 11, 2009,[8] the mandatory broadcast date ³ DTV is moved back to June 12, 2009, although stations were allowed to change earlier. The delay allowed for the distribution ³ m coupons for the purchase of converter boxes.[9] As of June 12, 2009, TVs and other equipment with legacy NTSC tuners cannot receive air broadcasts from television³s in the United States, unless the broadcast³n is from a low-power relay or transmitter. However, Class A stations shut down Anal³gic TV broadcasts on September 1, 2015, followed by a total shutdown of all low-power stations and repeater stations on July 13, 2021. Canada has a similar end date ³ AnalÃ ³gic TV set for September 1, 2011 (except in some remote northern regions).[citation required] It is feared that the U.S. shutdown ³ cause millions of non-cable TVs to and not by satÃ© lite "darken". Viewers who didn't upgrade to either a digital tuner TV or set-top box ended up losing their only source of television³ unless they trusted ³ the aforementioned broadcasters with no full power. A bill by Congress autorizÃ³ the subsidized converter boxes in a way that allows viewers to receive the new digital transmissions on their old TVs. The transition ³ continued with some 235,000 people requesting coupons after the transition date ³ June 12, 2009[10]. Two coupons of 40 ³ per US ³ were made available nominally from 1 January 2008 to 31 March 2009; each cup³ could not be used to purchase an approved coupon-eligible converter box. The coupons expired 90 days after the initial shipment and were not renewable. All households are entitled to receive coupons from the initial allocation of 990 million ³, after which a further 510 million ³ will be available in coupons for households that rely exclusively on the reception ³ air television³ n. On 4 January 2009, the coupon program reached its maximum limit of 1.34 billion ³[12] and any other consumer requests were placed on a waiting list[13]. Commandments of the Canadian government Main article: Digital television in Canada³In Canada, the Canadian Commission of Radio³Television and Telecommunications (CRTC) had set August 31, 2011 as the date on which the broadcasting service ceasedÃ ³ nÃ ³ÃÃ n analÃ ³ in 31 major markets in the country, including all provincial capitals, mÃÃÃÃs Ottawa (the national capital), and the largest of the other major urban centers[14]]. At the end of 2008, there were 22 Canadian satellite³digital television transmitters and all existing digital transit television licenses³s ban, as a license ³, the issuance ³ more than fourteen hours per week of programming³ but not already in the ³ service. Unlike in the US, there is no plan to subsidize ATSC converter purchases and no requirement that imported received receivers decode the digital signal. Canadian retailers are also not required to disclose the inability of new devices to receive DTV. The Canadian market has therefore been inundated with new obsolete NTSC equipment that cannot legally be exported to the United States. A limited number of ATSC receivers are located in Canadian retail stores as high³definition television ³ (HDTV) receivers. ATSC CECB converter boxes were first brought nationwide in October 2008, with chains such as Best Buy and Home Hardware offering a limited ³ selection higher prices than in the United States without government subsidies. ATSC tuners can also be present on the most recently manufactured TVs, as well as DVD recorders, FTA HDTV receivers and personal computer TV tuner cards.[³ required quote] In early 2012, almost all Canadian stations are transmitting an ATSC benefit, with a number of exceptions granted for regional and low-power stations. These can be reliably tuned in most cities with a good indoor antenna and an ATSC tuner. U.S.-based ATSC Series can be reliably tuned to an outdoor antenna and ATSC tuner in Canadian markets within 60 miles of U.S. broadcast ³. These markets include Toronto (from Buffalo), Windsor (from Detroit and Toledo), Vancouver (from Seattle and Tacoma), Montreal (from Burlington and Plattsburgh), Ottawa (from Watertown and Plattsburgh), and Fredericton (from Presque Isle). Indoor antennas (both passive and amplified) are easier to install, but outdoor antennas are better at tuning stations from farther distances.[citation required] Setting ³ and operation Most ATSC tuners have relatively simple on-screen menus, and automatically bring the user to a setup screen ³ when they first power up. This allows the user to choose the time zone and daylight saving time mode (since all stations transmit the time in UTC), and the ³ of bands for the stations. The scan "listens" on each channel from 2 to 69, and stops when it detects a digital carrier wave. If you are able to decode the station³ read your PSIP data and add your virtual channels to the channel map. If PSIP is not transmitted, the basic channel number is used and each transport stream is listed according to its TSID (converted from hexadecimal), or starting sequentially at .1, .2, .3, etc., depending on the tuner.[citation required] Several TV stations are using or have used a temporary channel to send their DTV messages and, upon completion of the transmission³ n channelÃ ³ move their digital transmission ³ back to their old channelÃ ³ or a third channel (sometimes the previous channel) ³ of another local station³), chosen in the choice of digital channel in the U.S. This requires all viewers to manually re-scan or add the new channel and possibly delete the old one. Doing a complete re-scan will generally cause other channels to be closed if they cannot be received at the time the scan passes its physical channel, so this is extremely undesirable, although many ATSC tuners only have this option³ n. Some have an ³-add function that does not remove what is already assigned in memory. Some allow the user to enter the physical channel and an unassigned subchannel, which causes the tuner to search the physical channel. Depending on the tuner, this may or may not automatically add the station ³ its digital sub-channels to the map, and/or to the user's "favorites." This can also leave the old mapping of "dead" channels in place, so that there is the new 8.1, dead 8.1, new 8.2, dead 8.2, etc. In most cases, the TV stations will not have ³ the actual frequency they are currently using on their website. If the auto scan does not pick up the seÃ±al and the tuner has the ability to manually scan the frequency, try to get the actual frequency from the station ³. This can allow one to remain on a frequency (channel) versus "scan" (moving too fast) and allow one to make antenna adjustments while observing only one problem channel.[citation required] Other errors that seem to be in the tuner are actually the of incorrect data sent by one or more stations, often including missing single ³ program guÃa data. Many ATSC tuners remember the EPG information ³ each station, ³ only for a few hours after watching a channel on that station³ n. Some will not remember at all (showing only the required channel banner), while a few will store data for days (although this requires watching each station for more than a few seconds to receive the ³ information). DirecTV DirecTV with ATSC tuners you can download the guÃa at any time, while other TiVo units download the guÃa data separately. TV Guide On Screen can also be used for this, but very few if any ATSC tuner includes this (which requires downloading all the data from the guo for all channels of a particular station³). Stations that send the wrong time are also a major problem, as this can skew or ruin the guÃ data for all stations until the correct time is received again from a different and correctly established station.[citation required] Manual tuning Each digital OTA channel number is composed of a main number and a sub-channel, for example 4.1, 4.2, etc. A guiÃ ³ is an alternative form of representationÃ ³ n: 4¢ Â 1, 4¢ Â 2Â ... The point and the guiÃ ³ are not interchangeable; both mean the same thing. The main channel numbers refer to the same radio frequencies as before. However, now "virtual channel" numbers (only known as a magic ³ channel number) are common. Therefore, Channel 4 digital signals can now be transmitted on Channel 43, or any other

frequency. When the ATSC tuner performs a channel analysis, it finds the seÃ±al on channel 43, learns that this material is called "Channel 4" and remembers that mapping. The user can tune in to "4", and the tuner will know how to tune in 43. Before performing a scan, it can be possible to access the programs directly by tuning ³ a manual, by entering 43Â¢ Â 1, 43Â¢ Â Â Â 2... After scanning, programs are usually accessed by entering 4Â¢ Â 1, 4-2 etc., but it can still be possible to access them directly at 43 as long as it is not the same as an already assigned channel. If the stations change their broadcast frequencies, it may be possible to access the new frequencies directly, as long as it is not the same as an already assigned channel, in which case go to that channel instead of the frequency, but the usual procedure is to re-scan all channels that only assign multiple versions of any superimposed channel.[citation required] See also ATSC DVD recorders Digital broadcasting Switching ³ digital Television³ digital terrestrial Television³ n high definition ³ n in the United States QAM tuner (radio) References ^ "FCC INTRODUCES PHASE-IN PLAN FOR DTV TUNERS" (PDF). FCC. 2002-08-08. Recovered 2006-06-05. ^ "Requirements for the capacity of receptionÃ ³ n digital televisionÃ ³" (PDF). FCC. 2005-11-08. Recovered 2006-06-05. ^ "FCC raises the date of the DTV tuner, broadens the reach". TWICE. 2005-11-21. Archived from original in 2007-02-05. 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"Table of Frequencies of TelevisionÃ ³ n". Recovered 2009-06-16. External links The FCC Patent DTV information site and regal information³ 2006-12-27 Enabling TV tuner technology for fully digital cable networks[permanent dead link] Recovered from " Page 2³ all modulation used by the US ATSC digital television ³ This article is about the most ³ modulation of television³ n. For certification ³ SBE, see Certified 8-VSB Specialist. 8VSB is the most modulation ³ used for broadcasting ³ the digital television ³ ATSC standard. ATSC and 8VSB modulation ³ mainly used in North America; In contrast, the DVB-T standard uses COFDM. A modulation ³ specifies how ³ flow to the radio station to transmit ³ information. ATSC and DVB-T specify the modulation ³ used for digital ³ television; In comparison³ QAM is the most modulation ³ used for cable. The specifications for a cable-ready TV, then, may indicate that it is compatible with 8VSB (for broadcast TV³ n) and QAM (for cable TV). 8VSB is a vestigial side band modulation ³ 8 levels. In essence, it converts a binary flow into an octal representation ³ by the amplitude displacement key of a sinusoidal carrier to one of eight levels. 8VSB is capable of transmitting three bits (23=8) per symbol; In ATSC, each symbol includes two bits of the MPEG transport stream that are entangled and modulated to produce a three-bit figure. The resulting seÃ±al is filtered by a Nyquist filter to eliminate redundancies in the lateral ³ and then ³ moves to the emission frequency³[1] Modulation technique ³ Vestigial lateral band modulation (VSB) is a ³ of modulation that tries to eliminate the spectral redundancy of pulse³amplitude modulation (PAM) sequences. The modulation ³ a carrier by a sequence of real-value data results in a sum and a frequency of difference, resulting in two sim carrier bands. The simeterÃa means that one of the side bands is redundant, so the elimination ³ a side band still allows the demodulation ³ n. Since zero-transition bandwidth filters cannot be performed, ³ implemented filtering leaves a vestige of the redundant sideband, hence the name Ã¢ Â VSBÃ¢ Â Â . Performance In the 6 MHz (megahertz) channel used for ATSC broadcast, 8VSB has a symbol rate 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 ³ cÃ ³ correction codes ³ n of forward errors. The eight levels of seÃ±al are selected using a lattice encoder. There are also similar modulations 2VSB, 4VSB, and 16VSB. 16VSB was especially intended to be used for ATSC digital cable, but quadrature amplitude modulation (QAM) has ³ become the de facto industry standard rather than being cheap and readily available. Energy Savings Advantages[discussed] A significant advantage of 8VSB for broadcasters is that it requires much less power to cover a comparable area to the previous NTSC system, and it is said to be better at this than the most common alternative system, COFDM.[citation required] Part of the advantage is the lower ratio ³ peak to average power required comparison with COFDM.[required quote] An 8VSB transmitter needs to have a maximum power capacity of 6 db (four times) its average power.[required quote] 8VSB is also more resistant to impulse noise.[required quote] they cover the same area while transmitting with an effective radiated power of approximately 25% of the broadcast power³ n analog³.[required quote] Although NTSC and the largest of the other television systems³ an analog ³ also Do not use a vestigial sideband technique, the unwanted sideband is filtered much more effectively ATSC 8VSB transmissions. 8VSB uses a Nyquist filter to achieve this. ReedÂ¢ Solomon Â bug fix is the primary system used ³ maintain data integrity. In the summer of 2005, the ATSC published standards for improved VSB or E-VSB [1]. Using advanced error correction³ the E-VSB standard will allow DTV reception ³ low power portÃ tiles receivers with smaller antennas much like DVB-H does in Europe, but using a transmissionÃ ³ n 8VSB. Disputes over the use of ATSC For some time, there was continued lobbying to change the modulation ³ ATSC to COFDM, the way DVB-T is transmitted in Europe, and ISDB-T in JapÃ ³ n. However, the FCC has always maintained that 8VSB is the best modulation ³ use in U.S. digital television broadcasting³ In a 1999 report, the Commission³n found that 8VSB has better threshold or carrier-noise (C/N) performance, has a higher data rate capacity, requires less transmitter power for equivalent coverage and is more robust for momentum and phase noise[2]. Consequently, in 2000, a request for regulation by the Sinclair Broadcast Group was denied³ requesting that broadcasters be allowed to choose between 8VSB or COFDM as appropriate for their coverage area[3]. The FCC report also acknowledged that "COFDM is generally expected to perform better in situations where there are multiple dynamic routes," such as operating ³ or in the presence of trees moving in high winds. However, with the introduction ³ 5th Generation demodulators in 2005 and subsequent improvements in generations 6 and 7, the equalization interval is now around 6¢ 60 to +75 microseconds (an extension ³ 135 microseconds) and has virtually eliminated the multipath, both static and dynamic, on the 8VSB ³. In comparison³ the EQ³range in COFDM is to Â 100 to +100 microseconds (propagation ³ 200 microseconds), but the application ³ this protective band space ³ COFDM substantially reduces its payload. In fact, much of Europe has adopted the 1280Ã Â 720p as the HD standard for DVB-T1 due to its reduced payload capacity [quote required]. The introduction ³ DVB-T2 aims to increase the capacity of terrestrial transmissions to carry 1920Ã Â 1080p content. 1920Ã Â 1080i has always been part of the 8VSB scheme since its inception, and its improved demodulators have had no effect on its innate payload capacity [citation required]. Due to the continued adoption ³ the 8VSB-based ATSC standard in the U.S., and a large population ³ growing ATSC receivers, a switch to COFDM will be a challenge. The largest number of terrestrial ³ broadcasts in the United States went off in June 2009, and 8VSB tuners are common to all new TVs, complicating even more of a future transition ³ to COFDM. However, with the development of ATSC 3.0, an updated version ³ the American digital TV standard designed for mobile reception ³ nÃ³ and better performance of the single frequency network, ATSC has decided to make the switch to OFDM with LDPC error correction (essentially COFDM).[4] As a result, ATSC 3.0 will be incompatible with all current ATSC 1.0 receivers, and viewers will need a new TV with a compatible tuner or converter box ora.[5] Unlike the previous digital TV ³ that was ordered by the FCC, the "transitionÃ ³ n" to ATSC 3.0 will be entirely voluntary. In addition, the FCC has required broadcasters that decided to switch to ATSC 3.0 to continue to offer their primary channel through a simulcast agreement ³ another market station (with a similar coverage area) ³ at least 2022[6]. Sinclair anunciÃ³ its intention ³ bring ATSC 3.0 to 40 by 2020.[7] 8VSB vs COFDM The FCC report quoted above also found that COFDM performs better in dynamic and high-level multipath static situations, and offers advantages for single-frequency networks and ³ n mÃ ³ vil. However, in 2001, a technical report prepared by the COFDM Technical Group concluded that COFDM offers no significant advantages over 8VSB. The report recommends conclusion³ that the receivers must be connected to raised outdoor antennas approximately 9 m high. Neither 8VSB nor COFDM were performed in an acceptable manner in most indoor testing facilities.[8] However, there were questions [Â Who?] as to whether the COFDM receiver selected for these tests "Â a transmitting monitor [2] that lacks normal front filtering" Â colorÃ³ these results. Testing using the same COFDM receivers with the addition ³ a front band pass filter yielded much better results for the DVB-T receiver, but no further testing was conducted.[3][permanent dead link] The debate over modulation ³ n 8VSB versus COFDM is still ongoing. COFDM advocates argue that it resists multipath much better than 8VSB. This is an important modulation property ³ receive HDTV in, for example, more ³ vehicles that is not possible with 8VSB. The first 8VSB DTV receivers (³ digital TV) often have difficulty receiving a signal in urban environments. The new 8VSB receptors, however, are better for dealing with multiple routes, but a moving receptor still cannot receive the seÃ±al. In addition, modulation ³ 8VSB requires less power to transmit a signal over the same distance. In less populated areas, 8VSB can outperform COFDM because of this. However, in some urban areas, as well as for ³ use, COFDM can offer a better reception ³ than 8VSB. Several "enhanced" VSB systems were being developed, notably E-VSB, A-VSB and MPH. The deficiencies in 8VSB regarding multipath reception³ can be solved by using cÃ³ correction codes ³ additional forward errors that decreases the useful bit rate, such as that used by ATSC-M/H for mobile reception ³ nÃ ³ / portÃ til. ATSC 3.0, the ³ most important televisión³ in the United States, useÃ COFDM. The vast majority of TV stations ³ U.S. use COFDM for their study to broadcast links and news gathering operations [quote required]. These are point-³-to-point communication links, not broadcast transmissions. VÃ© also ATSC tuner ATSC-M/H for receivers ³/portÃ tiles References ^ Sparano, David (1997). "WHAT EXACTLY IS 8-VSB ANYWAY?" (PDF). 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"Sinclair announces that 40 cities in the United States will receive ATSC 3.0 by 2020." Fierce video. Archived from the original on March 8, 2021. Retrieved March 8, 2021. ^ 8VSB/COFDM Comparison Report Archived ³ 2005-11-22 on the Wayback Machine External Links Â What exactly is 8-VSB anyway? The DVB-T is a multiplexing system by ³ orthogonal frequency coded or COFDM for short, but also is the cable (DVB-C) and satÃ© lite (DVB-S). The DVB-T is such as QPSK QAM or Quadrature Phase Shift Keying and Quadrature Amplitude Modulation. The DVB-S is implemented as QPSK QFM or Modulation³Quadrature-Phase Change Keyboard Frequency Quadrature. The DVB-C is QPM QAM or Phase Modulation³ Square ³ Amplitude Modulation. Obtained from " " "

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