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High Definition TV in the Arab World 2015

A white paper prepared by Arab Advisors Group March 2015

For a more detailed report on HDTV in the Arab World, please contact us

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High Definition TV (HDTV) is no longer an uncommon name in the Arab World. TV broadcast has gradually evolved during the last few decades from black and white with low contrast and pixel lag problems, into a more enjoyable experience for the viewers, with the introduction of High Definition TV!

Two decades ago digital broadcasting changed the shape of the television industry; TV started with a small box and a poor resolution, and it improved not only in terms of colors, images, video and audio quality, and reception, but also became a more interactive experience with the High Definition TV technology, which withdrew people from watching TV in the Standard Definition quality (SD).

With the quality of video and audio in the High Definition TV (HDTV), (which is superior to the Standard Definition TV (SDTV)), and the introduction of HD at exhibitions, electronics showrooms, billboards and TV ads, viewers are now able to enjoy the content of the HDTV, with the life-like images and the cinema-style experience.

Section I: Consumers' standpoint

High Definition (HD) marks the key change in the evolution of television since its transition from black and white to sheer color. As it is the case with any new technology.

Watching High Definition TV for the first time, the experience offers a higher level in picture resolution, which creates more of a cinema-like experience with the exceptional surround systems. This changes the user experience and engages the viewer.

The sharper high resolution images in High Definition are induced by a larger number of pixels used in building up a single image. The improved images go hand in hand with the growth in the sizes of TV screens. More and more, customers transition to HD often happens by default, for most of the new TV sets being sold today (Plasma, LCD, OLED, LED) are HD Ready.

As a new technology is widely adopted another one becomes outdated. This case applies to HD and SD channels, where the transition to HD will have its effect on SD, making it less commercial in the future.

Consumers are now able to enjoy HD through HD-DVD players, on-line streaming, new generation game consoles (Xbox one, PS4…) and Blu-ray players. This wide array of HD platforms drives HD into becoming the new TV viewing standard.

Section II: Broadcasters' standpoint

The evolution of TV over the years was not limited to the consumers; it also had its impact on the broadcasters. Since satellite bandwidth is essential, the main concern for broadcasters is to utilize it. The improved video and audio quality means that the signal will consume more bandwidth; a typical SD channel consumes between 2-4 Mbps of bandwidth on the satellite (based on which compression is used); MPEG-2 or MPEG-4 (see compression section), meanwhile a single HD channel consumes between 8-19 Mbps of bandwidth.

Broadcast in HD is not as simple as it may sound; it requires specialized equipment for broadcasters in order to send this enhanced quality signal. That also means that the receiving end should have dedicated equipment that is compatible to receive and display the broadcaster's signal.

With this improved quality, specialized equipment and the higher bandwidth consumption, broadcasters are facing higher operating costs. The typical TV viewer is not expected to and probably will not be willing to suddenly start paying for TV channels and content, unless there is a major benefit from doing that. This should be kept in mind of the broadcasters; it must be done gradually with the emphasis on HDTV becoming the new norm.

Turning HDTV into a revenue generating tool is very crucial. Broadcast in HD means delivering better, new, specialized content and services alongside the enhanced quality. It should also provide an opportunity for broadcasters – especially Free-To-Air channels – to leverage higher advertising rates and convert to Pay-TV for an incremental revenue stream.

By March 2015, OSN (Orbit Showtime Network), one of the major pay TV providers in the MENA region expanded its HD channels bouquet to 49 unique HD channels. By end of March 2014, OSN had a total of 38 unique HD channels which translates into 29% growth in HD channels offered by OSN alone in one year. It is clear that OSN is investing more in HD content. The introduction of HDTV also gave the pay TV providers the opportunity to exploit TV services that subscribers were not willing to pay for in the past, for example OSN offers on-demand TV entertainment service the "OSN Plus HD box" this service provides subscribers with On Demand Movies, Storage capacity, Dolby digital plus and Control Live TV.

Established in 2012 and headquartered in Dubai Media City, My-HD is a Direct to Home (DTH) platform. The High Definition satellite Pay-TV platform offers 57 channels, out of which 46 are HD. Some of the prominent channels available to subscribers are the 11 MBC HD channels, Discovery Science HD and Animal Planet HD, five exclusive Rotana HD channels, four exclusive HD channels from Al Nahar; in addition to other exclusive channels like Physique TV HD and CMusic. In March 2015, My-HD launched H2 Channel, an extension of the HISTORY brand, in HD and added it to its list of HD channels offered in the MENA region.

The transformation is not for the pay TV channels only, FTA channels are also required to go with the flow; transforming from SD to HD.

FTA channels have the option of benefiting from low-pay TV platforms; this will encourage viewers to try and get HDTV at a relatively low price when compared to pay TV providers, and at a relatively low cost for the broadcasters.

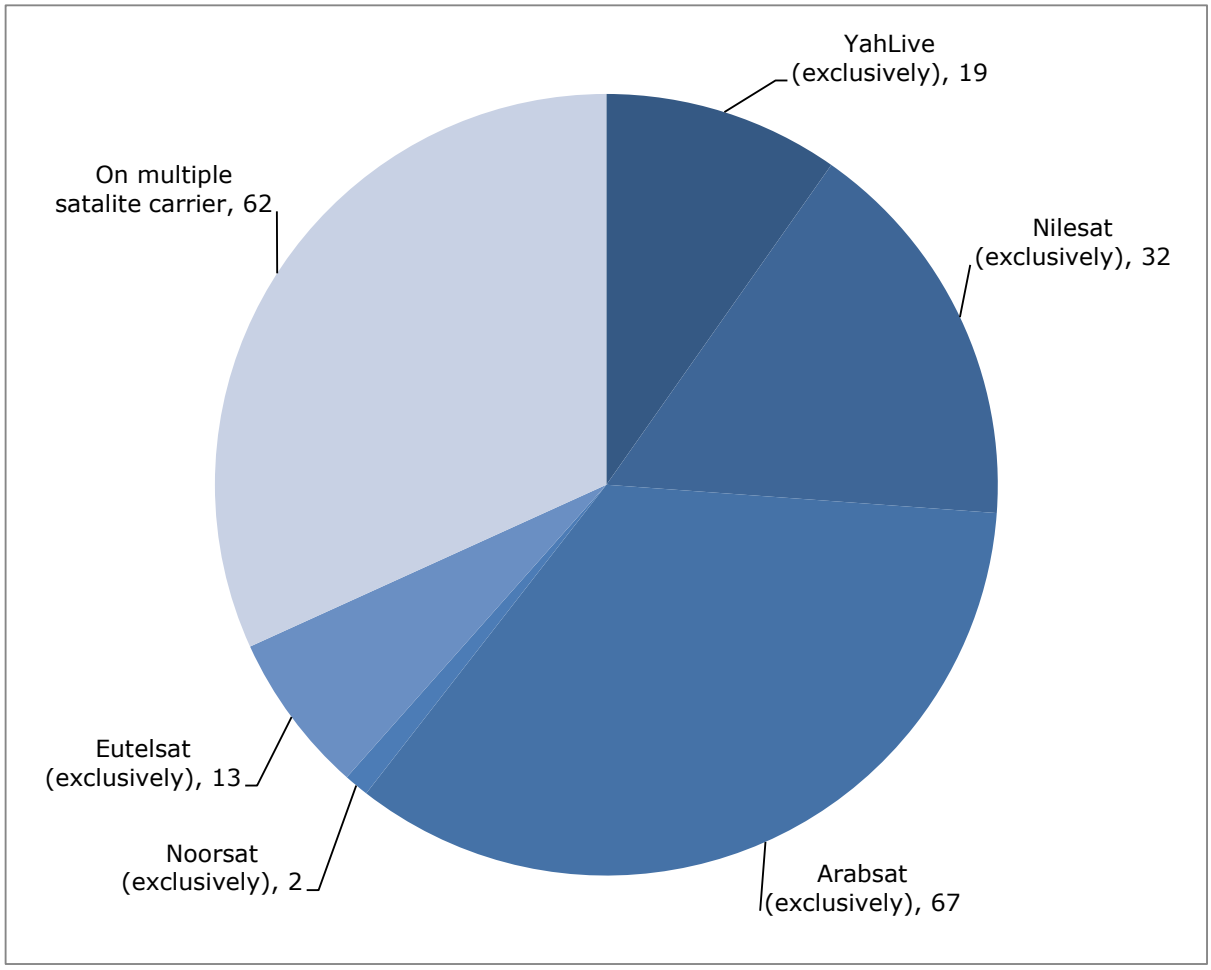
Section III:HDTV in the Arab World

There are plenty of satellites that cater to the Arab World, this report details the seven main satellite operators that target the region, **Arabsat, Es'hailsat, Eutelsat, Gulfsat, Nilesat, Noorsat,** and **YahLive**

Exhibit 1 shows the number of unique HD channels (channels available on more than one satellite carrier were counted once) on all the seven analyzed satellites by March 2015. Arabsat came first with a total of 67 unique channels, for their part Gulfsat and Es'hailsat had no unique channels by March 2015. The graph also shows the number of channels available on multiple satellite carriers.

Exhibit 1

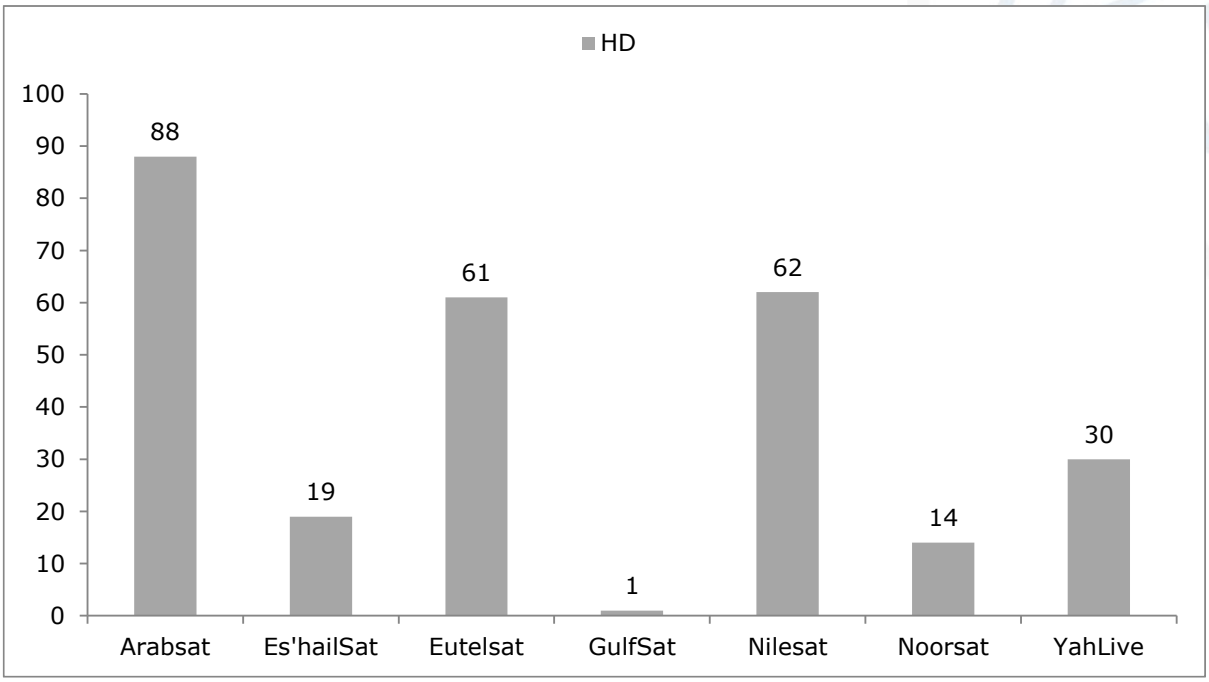
Distribution of HD channels on Arabsat, Es'hailsat, Eutelsat, Gulfsat, Nilesat, Noorsat, and YahLive, by March 2015



Source: Arab Advisors Group, Satellite operators

Exhibit 2

Satellite HD channels by March 2015



Note: The channels were counted according to their occurrence on each satellite carrier
Source: Arab Advisors Group, Satellite operators

Section IV: Enjoying HDTV

In order to ensure the best High Definition viewing, three things must be done; first make sure to have an HD display or a screen, second is to have an HD signal source (Blu-ray disc, HD streaming, satellite, cable…etc), and finally connect the source to the display using an HDMI (High Definition Multimedia Interface) cable. The HDMI cable is a single cable with a very high bandwidth; which allows it to carry the video and the audio signal from the source to the screen.

Having an HD screen does not mean you are watching in HD, there must be an HD source (signal) whether it is a Blu-ray disc, HD streaming, satellite or cable provider. Connecting a traditional DVD player to an HD screen will not give you a superior image; in fact it will be worse than an SD screen, why? The HD screen will display the image at full screen size (upscale), which means that the DVD image will be stretched according to the resolution of the HD screen; hence the image pixels might become more visible. What is important is to always make sure that you are using an HD signal source to guarantee the HD experience.

There are four options (technologies) available when picking up an HDTV screen: LCD, LED, OLED and Plasma.

- LCD screen: A liquid crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals.
- LED screen: An LED display is a flat panel display, which uses light-emitting diodes as a video display.
- OLED: Is a light-emitting diode (LED) in which the emissive electroluminescent layer is a film of organic compound which emits light in response to an electric current.
- Plasma: They are called "plasma" displays because the technology utilizes small cells containing electrically charged ionized gases, or what are in essence chambers more commonly known as fluorescent lamps.

The screen types differ based on technologies used to “light the screen”, but they all come in High Definition resolution. The differences are mainly the refresh rates, contrast, thickness and available sizes.

After getting all set up and connected, the HDTV experience can be enhanced by connecting an audio surround system; since most of the HDTV signals already carry a surround audio signal (Dolby digital) alongside the video.

Section V: Explaining the difference of HDTV

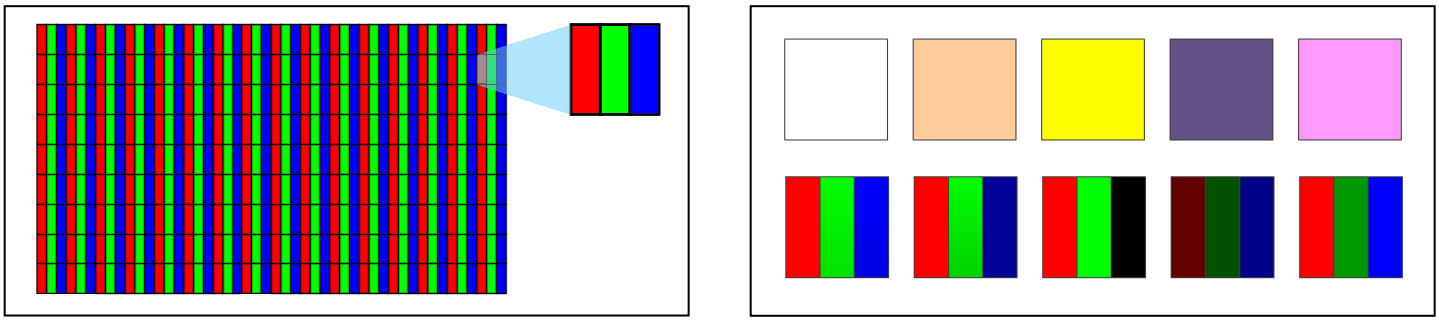
Pixels

According to the IEEE standards, a pixel (picture element) denotes a single point in a graphic image. In digital imaging, a pixel (picture element) is the smallest addressable screen element in a display device; which represents the smallest element of a picture that can be plotted or controlled.

Every pixel is composed of three color-generating components. On a display screen, each pixel is commanded to generate a combination of different red, green and blue color intensities to produce all color shades. On an HD display, these pixels are smaller and placed closer to each other.

Exhibit 3

How pixels work on an HD display



Source: Arab Advisors Group

Resolution

The main difference between SDTV and HDTV is the resolution. The resolution is the number of lines displayed on the TV screen. The SDTV had two main world standards that dominated the market: PAL and NTSC.

The PAL (Phase Alternating Line) system was developed in Germany by Walter Bruch, and used mainly in Europe by European Broadcasting Union. The PAL system consists of 625 (but with only 575 lines visible on screen) at 50Hz and a frame rate of 25 frames per second (fps). Outside Europe (USA and Japan mainly), the NTSC system is the common standard for broadcast. The NTSC, which was set by the National Television System Committee in the USA, broadcasts 525 lines at 60Hz at 30fps. Nowadays SDTV is transmitted digitally, so that there is no signal loss regardless of distance. SDTV is offered in 480i which is able to transmit and produce images which are of a higher quality than standard analog broadcast.

In case of the HDTV, the scenario is a bit more complicated, but the main concept is that the image consists of either 720 horizontal lines with 1280 vertical lines or 1080 horizontal lines with 1920 vertical lines, which explains the superiority over the SDTV. There are two techniques of displaying the lines on the screen; “Interlaced” (i) and “Progressive” (p).

In Interlaced scanning, the picture frame is split into two fields of alternating lines; one field is for the odd numbered lines, and the other one is for the even numbered lines. Therefore, the odd lines shows a part of the image and the even lines shows the other part, but when displayed at a high refresh rate the human eye sees the complete image without noticing the difference between the two.

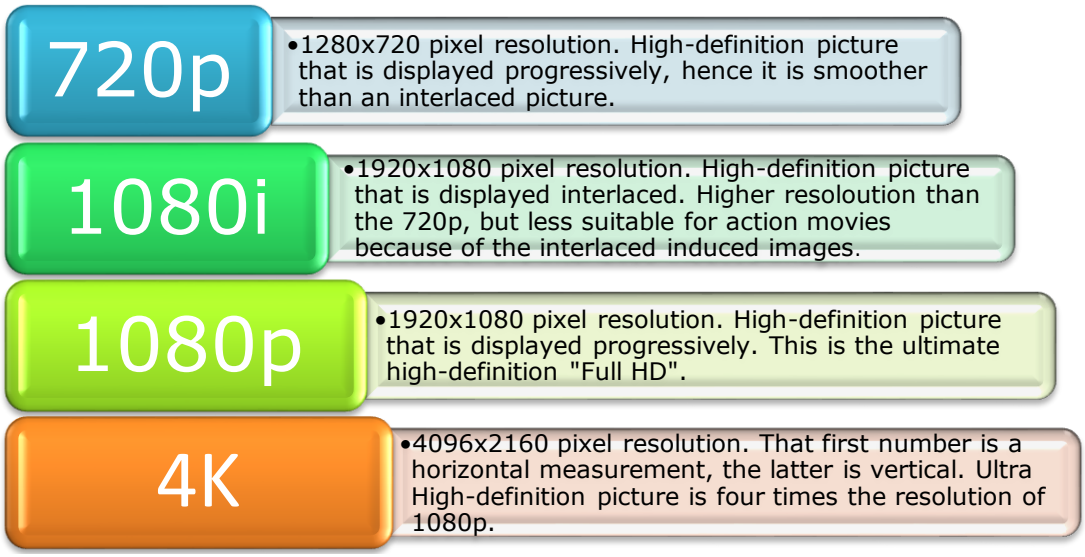
Progressive scanning captures the picture frame as a single image; so it transmits and displays all the lines of the image at the same time. This method means that technically there is no "flickering" on the screen when shooting fast moving objects.

As for the Ultra HD, also known as 4K, the resolution is 4096 horizontal lines by 2160 vertical lines. Ultra High-definition picture is four times the resolution of 1080p. UHDTV also comes in a lower resolution for home consumers with 3840 by 2160. There were no satellites in the Arab World broadcasting in the Ultra HD resolution by March 2015.

Nowadays HDTV is classified under three categories: HD Ready, Full HD, and Ultra HD resolution. Basically the HD Ready are TV screens with a resolution of 720-p or 1080-I, Full HD are TV screens with a resolution of 1080-p, whereas Ultra HD are TV screens with a 4K resolution.

Exhibit 4

HD ready, Full HD and Ultra HD resolution



Source: Arab Advisors Group

Aspect Ratio

Aspect ratio is the relation between the horizontal (width) and vertical (height) measures of the viewing screen. In an SDTV screen, the aspect ratio is 4:3; which means, its 4 units wide by 3 units high. As for the HDTV, screens have an aspect ratio of 16:9 which is known as "Widescreen". This breaks down into 1.76 inches of width for every inch of height, calculated by dividing 16 by 9.

Compression

Since satellite bandwidth is very precious, HDTV signal needs to be compressed in order for it to be transmitted and received through a satellite network.

Compression is the art of reducing the amount of data used to communicate information. Compression is based on the fact that information, by its character, is not random but exhibits order and patterning. If that order and patterning can be extracted, the essence of the information can be represented and transmitted using less data than would be needed for the original. At the receiving point, the original data can be fully recovered with minimal loss.

MPEG (Moving Pictures Experts Group) was formed by the ISO (International Standards Organization) to set standards for audio and video compression and transmission. MPEG-4 is an open standard that can address the opportunities enabled by the digital revolution. MPEG-4 dramatically improves audio and video compression, requiring less bandwidth, and hence enabling the distribution of content and services from low bandwidths.

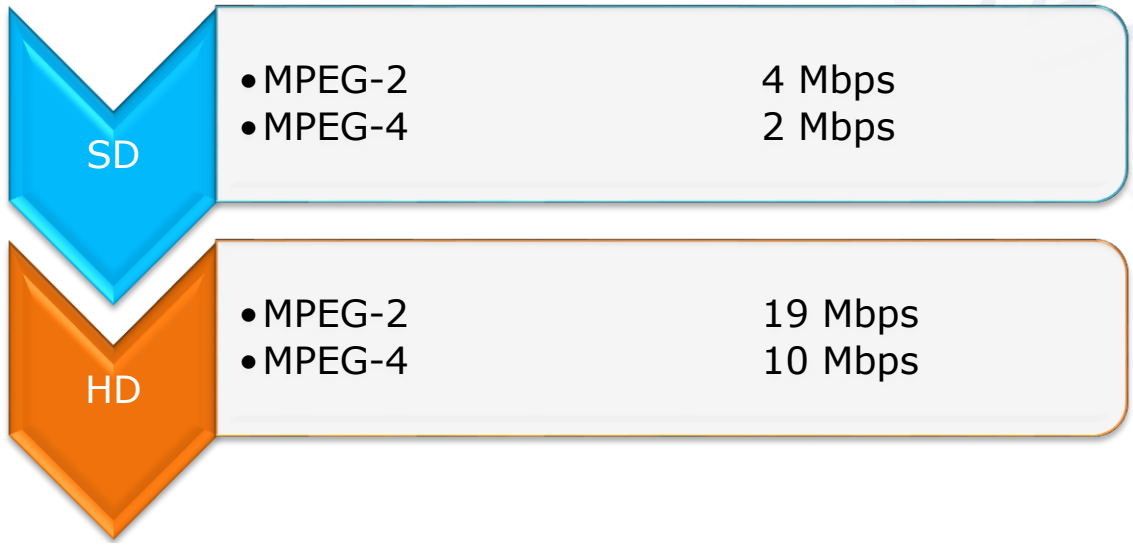
Section VI: How to broadcast in HD

After the standardization of the DVB-S for satellite broadcast by the Digital Video Broadcasting body in the 1990's, the DVB standards started looking for a second generation of satellite broadcast; "The DVB-S2". With the demand of better video and audio quality delivered through satellite TV channels, the second generation of satellite broadcast was inevitable. The main concept behind DVB-S2 is to transport HD quality video and audio (which consume more bandwidth) at the most efficient way. This of course was achievable by the development of new compressions that are used nowadays, like MPEG-4, in addition to channel coding (LDPC codes) and an array of modulation formats as QPSK, 8PSK, 16APSK and 32APSK.

A single HD channel consumes around 15 Mbps to 19 Mbps of bandwidth to transport using MPEG-2 compression, but it can consume only 8 Mbps to 10 Mbps using MPEG-4 compression. The MPEG-4 compression can compress video and audio more efficiently than MPEG-2, which allows satellite operators to utilize the bandwidth available for more HD channels, without the need to update or launch new satellites, which is extremely expensive.

Exhibit 5

Compressing SD and HD signals using MPEG-2 and MPEG-4



Source: Lyngsat, SES

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