Press Release
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Danish world premiere of the next generation mobile TV standard DVB-T2 Lite

As one of the first in Europe, Open Channel started trials of the next generation Digital Terrestrial TV standard - DVB-T2 in 2010. Open Channel again leads the way as the first in the world to air the next generation of mobile TV, based on the new standard DVB-T2 Lite profile. The service is now on air on UHF channel 39 in Copenhagen.

"We received so much interest in our T2 Lite trials when we announced it at the broadcast fair IBC in Amsterdam in September last year," says Open Channel's CEO, Kenneth Wenzel. We are pleased with the interest shown by a large number of companies providing equipment and expertise for the trial, such as Danish firm ProTelevision Technologies, Spanish BTESA, Norwegian T-VIPS and the Dutch company DekTec.

Open Channel last year obtained a T2 Lite trial license from the Radio-TV Board, for UHF channel 39 (also called MUXKBH-2) in the Copenhagen metropolitan area, starting on January 1st 2012 for a period of up to three years. Broadcast with vertical polarization, 2 kWatt ERP at a height of 100 meters from the TDC radio tower at Borups Alle in the center of Copenhagen, the signal can be received by more than 700,000 households.

Tablets will open new opportunities.
The background for the Open Channels trial is that DVB-H was never the success that many thought and hoped for. "One of the problems is that a DTT operator had to pay for the installation and operation of an independent broadcasting system that could only be utilized for mobile TV. In reality it meant more expense than income. Furthermore, there was no demand to see broadcast TV on a tiny cell phone screen - and certainly not if you had to pay for it. In other words, no business case, "says Kenneth Wenzel.

Now, with the increasing popularity of iPads and other tablets, the demand for linear TV viewing on smaller screens has arrived.

When people watch TV on a tablet today, it primarily happens through home Wi-Fi or outdoors via a Wi-Fi hotspot or 3G networks.

The challenge with the new tablets is that they have a screen size of 720p or 2048x1536 with the new iPad, so they easily need a bandwidth of 2 Mbit/s. With the growing numbers of tablets in use, the bandwidth necessary for unicast mobile TV can be a challenge for mobile operators - especially during major sporting events. Here, DVB-T2 Lite provides an efficient new platform for broadcasting mobile TV.

Double capacity.
DVB-T2 and particularly the T2 Lite profile, enable a reduction in the memory and power consumption requirement for receiver devices. It is now possible to build a mobile T2 broadcast network with the same capacity as DVB-T approx. 20-25 Mbit/s and twice the capacity compared to a DVB-H mux.

stationary reception	DVB-T	20 - 22 Mbit/s	DVB-T2	37 - 40 Mbit/s
mobile reception	DVB-H	10 - 13 Mbit/s	DVB-T2 Lite	20 - 25 Mbit/s

This means that network operators can send the **same broadcasting signals** to both the television in the home and to handheld devices like iPads, so the DTT operator no longer needs to build a separate broadcasting set up for mobile TV only.

Since we have already experienced delays in the deployment of mobile services using DVB-H, it might be worthwhile to revisit the alternatives and deploy the more efficient DVB-T2 Lite profile instead. We have already witnessed the successful adoption of DVB-T2 Lite for mobile services in Finland and we intend to demonstrate that this is the best solutions for Denmark too.

Open Channel will test the new features in DVB-T2 e.g. MISO (Multiple-Input Single Output) and Multiple Physical Layer Pipes (multi PLP) which allow separate adjustment of the robustness of each delivered service within a channel to meet the required reception conditions (e.g. in-door or roof-top antenna). It also allows transmissions to be tailored such that a receiver can save power by decoding only a single service - where DVB-T2 Lite profile has set an upper limit for each PLP's at 4 Mbit/s - rather than the whole multiplex of services

at i.e. 37-40 Mbit/s.

Open Channel plans to broadcast a total of 16 PLP's, each with its own digital radio or television channel during the trials.

Strong Partnership
Open Channel collaborates with Danish ProTelevision Technologies, which develops and manufactures professional OEM transmission equipment to markets across the world.

ProTelevision is pleased that experiments and tests of their modulators are made in their own "backyard". This gives ProTelevision the opportunity to develop and test their software before it gets sent out to customers worldwide. “There have been a number of technical issues, such as high-power usage at the receiving device, that have seriously hampered the uptake of mobile radio and video services. The IBC demo last year and the Open Channel trial in Denmark will show that these technical issues are now solved and I look forward to playing a major part in DVB-T2 Lite’s exciting future” said Morten Simonsen, CEO, ProTelevision.

The Norwegian company T-VIPS has supplied a key component of the system - the DVB-T2 Gateway. "I'm very excited to drive forward the new DVB-T2-Lite profile" says Janne T. Morstøl, COO at T-VIPS. "For the operator it is important to know that DVB-T2 Lite is a subset of the DVB-T2 standard, which means that flexible DVB-T2 solutions as T-VIPS’ CP560 DVB-T2 Gateway and ProTelevisions’ DVB-T2 modulator can be upgraded for the deployment of DVB-T2 Lite. This minimizes the cost of introducing new mobile TV services.

"The Spanish company BTESA, who has supplied the medium power air-cooled transmitter, which just in 7U height can supply 500Wrms after output filter, “look forward to the successful conclusion of the Open Channel trial and expect that DVB-T2 Lite services will become an important part of terrestrial operators’ efforts to ensure greater customer engagement, retain and win customers and launch new revenue generating services” said Juan Lluch Ladrón De Guevara, R&D Design Engineer, BTESA.

At present, there are no DVB-T2 integrated televisions or set-top boxes available in the Danish market that support the T2 Lite profile signaling because manufacturer still uses Sony Semiconductors 1st generation DVB-T2 Demodulator IC CDX2820 from January 2010 instead of Sony’s 2nd generation CDX2834 / 2836 or e.g. Broadcom BCM3461 T2 demodulator chip.

Open Channel will therefore use DekTec T2Expert DVB-T2 receiver until the new DVB-T2 / T2 Lite receiver appears on the market. Open Channel expects this will happen in Q3 2012.

DVB-T2 Lite - the future standard of digital radio.
DVB-T2 Lite is not only suitable for mobile TV. It is also highly suitable as the future standard of digital radio in place of DAB & DAB+ from, respectively 1995 & 2007. With the DVB-T2 / T2 Lite profile you get 2.7 to 3.7 Mbit/s capacity (~ 40 / ~ 55 HE AACv2 radio stations) compared to the DAB / DAB+ 1.1 Mbit/s capacity (~ 6 mpeg1 layer II / ~ 16 HE AACv2 radio stations) with the same propagation model.

Open Channel last year also acquired a license for a digital radio trial of DVB-T2 on a so-called T-DAB frequency VHF channel 9D with a channel bandwidth of 1.7 MHz, also known MUXKBH-3, and have plans to go live later this month with 15-20 international digital radio stations - and later this year this will increase to 50 digital radio stations with separate PLP’s for each station.

About Open Channel
Open Channel has since 2006 performed experiments and trials with terrestrial digital television. Currently broadcasting three different DTT trials in Copenhagen, signals can be received by more than 700,000 households, representing 28% of all Danish households.

Open Channel has placed itself at the forefront in the recent development and implementation to the latest features of DVB-T | DVB-T2 & DVB-T2 Lite, where Copenhagen has become a focal point for testing future digital radio & television transmission and development of future digital receiver devices.

- the MUXKBH-1 (UHF channel 35) trial is focused on deployment of HDTV on local TV stations.

- the MUXKBH-2 (UHF channel 39) trial is now focused on the future mobile television format, DVB-T2 Lite, which is the successor of DVB-H.

- the MUXKBH-3 (VHF channel 9D) trial is focused on the future format of digital radio DVB-T2 / T2 Lite as an alternative to DAB / DAB + on a so-called T-DAB channel (1.7 MHz BW).

About T-VIPS AS
T-VIPS is a global leader in professional video transport solutions for contribution, distribution and Digital Terrestrial Television (DTT). We help customers deliver next-generation TV services such as 3D, HDTV, live events and local content. Our IP based video transport and Digital Terrestrial TV solutions allow network operators, broadcasters, and content providers to deliver the highest picture quality at the lowest cost. Leveraging our technology expertise in video over IP, video compression, transport stream processing, monitoring and seamless switching we deliver products and solutions that improve Quality of Service (QoS), ensure high quality in live contribution workflows and enable state of the art DTV.

About ProTelevision Technologies A/S
ProTelevision is a leading supplier of the modulators, repeaters and transceivers that are at the heart of today and tomorrows terrestrial TV and Telco networks. Its solutions are installed in more than 10,000 transmitter sites around the world. The company is dedicated to providing its customers with superior state-of-the-art solutions, with professional service and support. www.protelevision.com

About BTESA Broad Telecom S.A.
BTESA, Spanish company having a solid background and more than 30 years experience in broadcasting, designs and manufactures Analogue/Digital (DVB-T/H, DVB-T2, ATSC, ISDB-T, DAB) TV transmitters and repeaters, from low power Multi-channel Gap-Fillers to high power Liquid-Cooled TV Transmitters up to 40kWps/12kWrms. BTESA worldwide presence in turn-key projects shows the customers' confidence in our products and services. www.btesa.com

About DekTec Digital Video B.V.
DekTec manufactures digital-video interface adapters (PCI, USB, IP) and associated software for the professional T&M and Broadcast Infrastructure markets. www.dektec.com

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Additional information

MUXKBH-2
UHF channel 39 (618 MHz)
DVB-T2 version 1.3.1 | T2 Lite MISO | 64 QAM | 16K-ext | GI 19/256 | CR 1/2 | PP3
Net bitrate 20.473 Mbit/s
TDC radio tower at Borups Alle in the center of Copenhagen
Maximum radiated transmit power: 2 kW ERP omnidirectional
Antenna Height: 100 meter
Polarization: Vertical

DVB-T2-Base
DVB-T2 is the follow-up system of the digital terrestrial transmission (DTT) system DVB-T. It offers improved efficiency, robustness and flexibility. It introduces the latest modulation and coding techniques to enable highly efficient use of the terrestrial spectrum for the delivery of audio, video and data services to fixed, portable and mobile devices. These new techniques make DVB-T2 much more efficient than previous DTT systems. Possible bandwidths for the DVB-T2 operation are 1.7, 5, 6, 7, 8 and 10 MHz

As with its predecessor, DVB-T2 uses OFDM (orthogonal frequency division multiplex) modulation with a large number of sub-carriers delivering a robust signal. Just like DVB-T, DVB-T2 also offers a range of different modes, making it a very flexible standard. DVB-T2 uses the same error correction coding as in DVB-S2 and DVB-C2: LDPC (Low Density Parity Check) coding combined with BCH (Bose-Chaudhuri-Hocquengham) coding offers a very robust signal. Several options are available in areas such as the number of carriers, guard interval sizes and pilot signals, so that the overheads can be optimized for any target transmission channel.

An important new element of DVB-T2 are Multiple Physical Layer Pipes (MPLP) which allow separate adjustment of the robustness of each delivered service within a channel to meet the required reception conditions (e.g. in-door or roof-top antenna). It also allows transmissions to be tailored such that a receiver can save power by decoding only a single service rather than the whole multiplex of services. Furthermore Future Extension Frames (FEF) allow the standard to be compatibly enhanced in the future. FEF are basically placeholders for new services which are not supported by the already existing receiver population. An existing receiver will detect the FEF and not decode its content. New receivers may access the FEF and provide additional services.

DVB-T2-Lite
DVB-T2-Lite is an additional profile that was introduced in July 2011 to even better support mobile as well as portable TV & digital radio and also to allow for cost-reduced implementation. The new profile is defined as a subset that adds two additional LDPC code rates to the main DVB-T2 specification. Since only elements relevant for mobile and portable reception have been included in the DVB-T2-Lite subset and the data rate is restricted to 4 Mbit/s per PLP, the implementation complexity has been reduced by 50%. DVB-T2-Lite is also the first additional transmission frame type making use of the FEF approach which allows that DVB-T2-Lite and T2-base can be transmitted in one RF channel.

DVB-T2-xxx
DVB-T2-Lite will not be the last additional profile for DVB-T2. The DVB technical group is currently working on an additional profile which will add new technologies to T2-lite. At this moment in time it is too early to predict which new elements will be added, however it can be assumed that MIMO will be a part of the new profile. According to the current schedule this new profile will be finalized by the end of 2011 and will provide the most sophisticated air interface for mobile TV.