

# TV-on-Mobile Solution

Tuner, channel decoder, MPEG source decoder, and complete software stack

This power-optimized hardware/software solution enables complete TV-on-Mobile functionality, for the fastest time-to-market.



## Key benefits

- Fastest time-to-market
  - Complete hardware/software solution
  - Multiple standards (DVB-H, DVB-T)
  - Development boards and reference applications
  - Programmable features for easy in-field upgrades
- Efficient, low-power operation  
(10+ hours of TV-watching on standard 700-mAh battery)
- Smaller size due to very high integration

## Hardware features

- Highly integrated two-chip solution
  - SiP with DVB-H/T TV tuner and channel decoder (9x9 mm<sup>2</sup> HVQFN)
  - Nexperia™ PN4008 MPEG source decoder (12x12 mm<sup>2</sup> LFBGA)
- DVB-H/T TV tuner
  - Zero-IF architecture
  - Low power (20 mW DVB-H)
  - US version (1670 MHz) also available
- Channel decoder/demodulator
  - Multiple standards (DVB-T/H, ISDB-T)
  - Multimode OFDM receivers on roadmap
- MPEG source decoder
  - ARM9 CPU core with 16k data and instruction caches
  - Power-optimized, 25-bit DSP

## Software features

- Seamless compatibility with Nexperia software stack
- Protocol stacks for IPDC over DVB-H and for DVB-T
- DVB-H middleware, ESG, PSI/SI, service Service and content Content manager/player, Open Standard common Middleware API
- Multimedia codecs and DRM encryption

The Philips TV-on-Mobile solution dramatically reduces time-to-market for TV-enabled cellular handsets. It provides all the key hardware and software components for full TV operation, including a TV tuner; a programmable channel decoder / demodulator; an MPEG source decoder; and a complete software stack, implementing IPDC over DVB.

The TV-on-Mobile solution supports multiple standards (DVB-H, DVB-T) and delivers low-power operation, providing more than 10 hours of TV-watching with a standard 700-mAh battery. Very high integration, combining a System-in-Package IC with an advanced application processor; enables a smaller design. Programmable options make it easy to support evolving standards and introduce upgrades, even after systems have been deployed in the field. Reference designs and development boards, available in large and small formats, ensure a smooth development process.

The TV-on-Mobile solution combines technologies and design expertise gained from several areas. Philips is the de facto leader in analog TV solutions, has more than 10 years experience in OFDM technologies, and offers set-top box products that deliver best-in-class performance for DVB-T. Several award-winning picture improvement algorithms of Philips can also be applied for enhancement of the TV experience on a mobile phone display. Philips' extensive experience in RF design improves tuner performance while leadership in power management units and low-power WLAN yields techniques for lowering power consumption in mobile applications of all kinds.

# PHILIPS

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## Hardware features

The programmable TV-on-Mobile solution is designed to keep pace with technology as the DVB standard continues to evolve. The solution supports the new DVB-H standard and the existing DVB-T, with uncompromised, low-power performance during reception.

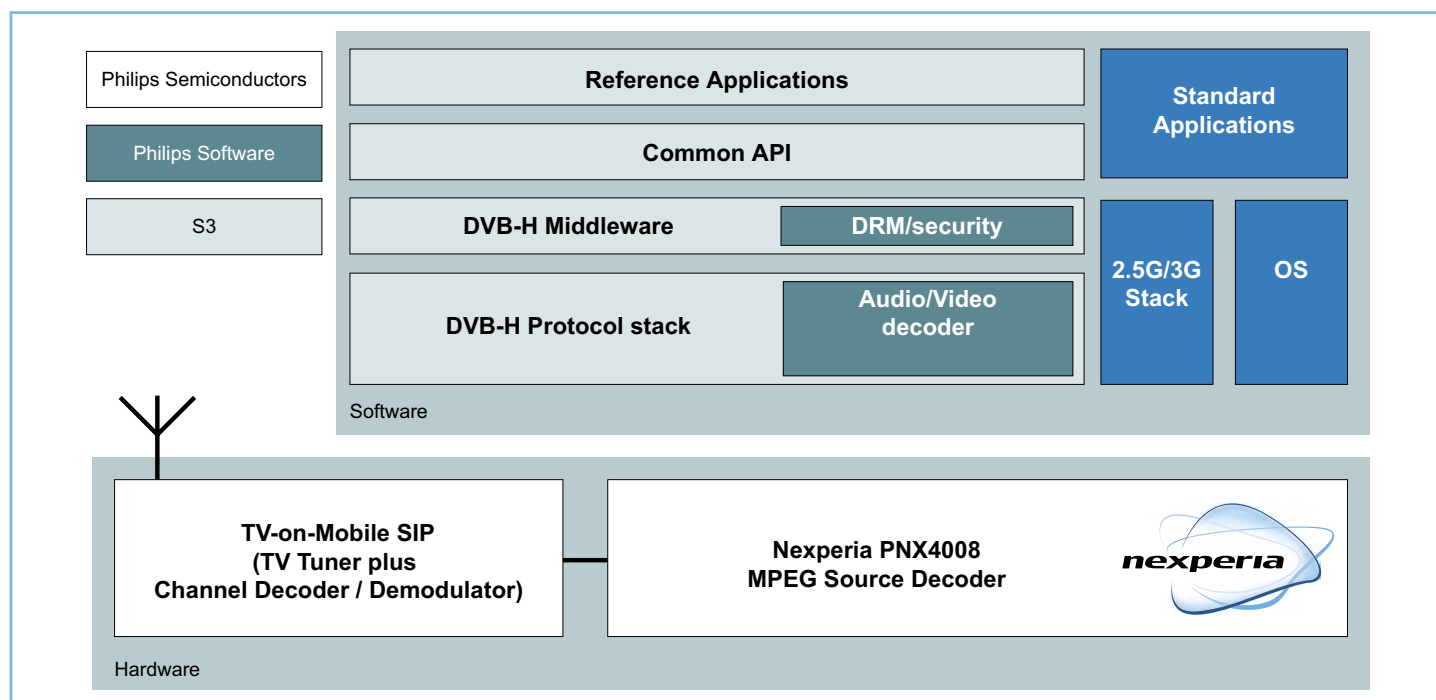
### SiP with TV tuner and channel decoder / demodulator

The TV-on-Mobile solution uses a highly integrated SiP IC to perform advanced TV tuning and channel decoder / demodulator functions.

The SiP's TV tuner function is based on the TDA18281, a Zero-IF DVB-H/T tuner that consumes only 20 mW of power in DVB-H mode and only 150 mW in DVB-T mode. Housed in an HVQFN32 package that measures only 5x5 mm<sup>2</sup>, the tuner supports a supply voltage of between 2.8 and 1.8V, has a noise figure of 4 dB, and an in-band input IP3 figure of -7 dBm. For the US market, a DVB-H tuner that operates in the 1670-MHz range is also available.

The SiP's channel decoder / demodulator function is based on the TDA10101, a low-power, DVB-H/T channel decoder / demodulator that consumes less than 30 mW in DVB-H mode. It uses a DSP architecture, so it can be programmed to support multiple standards, including DVB-H/T and (in later versions), ISDB-T. Programming options support field upgradeability, so the decoder can adapt to changing broadcast needs. Excellent Doppler performance (90 Hz) guarantees stable reception under mobile conditions. Output signals use the SPI interface, which is compatible with a wide variety of application co-processors, and the receiver operates under I2C-bus control. The decoder can also function as a multi-mode OFDM receiver, for use in WLAN applications.

The SiP's TV tuner and channel decoder functions are also available as separate ICs. The TDA18281 DVB-H/T TV tuner is housed in an HVQFN32, the TDA10101 channel decoder in a TFBGA64.



Block diagram of the Philips TV-on-Mobile solution

#### *Nexperia PNX4008 MPEG source decoder*

The Nexperia PNX4008 is an advanced mobile multimedia processor. It uses a unique architecture built around an ARM926 processor that is accelerated by dedicated video, audio, graphics, and security subsystems that optimize performance and power consumption. For the TV-on-Mobile solution, the PNX4008 has been optimized to work with the TDA1821 tuner and the TDA10101 channel decoder. Its ability to support CIF resolution MPEG-4 AVC (H.264) and MPEG-2 playback makes it ideal for DVB-H and DVB-T source decoding.

#### **Software features**

The TV-on-Mobile solution includes complete software functionality, developed by Philips and its third-party partners, for full TV operation.

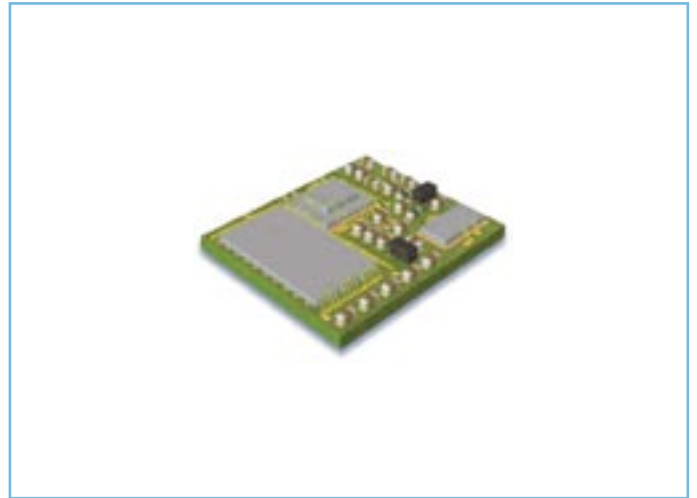
#### *Philips software stack*

The Philips software stack Nexperia Cellular System Solutions has built-in support for mobile TV. Added to this are algorithms from Philips Software, including MPEG4/H.264 audio/video codecs and a DRM agent, provide advanced multimedia capabilities and handle premium content.

#### *S3 onHandTV software stack*

For optimized performance in TV applications, Philips has partnered with Silicon & Software Systems Ltd. (S3), a leading provider of DVB-H/IPDC software. S3's onHandTV solution includes protocol stacks, middleware and applications, working seamlessly with the Philips software stack to deliver the TV-on-Mobile solution.

onHandTV provides a fully featured ESG Database Management System, Services Manager and Content Player, integrated with DVB-H transport and control protocol stacks.



The tuner/decoder SiP measures only 9x9 mm<sup>2</sup>

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Philips Software  
Silicon & Software Systems Ltd. (S3)

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