

OUR SERVICES

Fraunhofer IIS develops hard-, firm- and software solutions for DVB-S2X wideband transmission:

- Consulting and design support
- Development of antennas, RF/IF frontends, signal processing modules, and system deployment
- Provision of equipment as OEM solution
- Customization and integration of IP cores for wideband demodulators and high-speed FEC decoders
- Equipment interoperability and performance validation in end-to-end hardware testbed

PROJECT REFERENCES

- Direct to Home System Demonstrator for High Throughput Multimedia Applications
(ESA Contract No. 4000103596/11/NL/AD)
- Ultra-High Throughput Transmission Through Wideband Ka Transponder
(ESA Contract No. 4000110170/14/NL/EM)
- Beam Hopping Emulator for Satellite Systems
(ESA Contract No. 4000115704/16/NL/AD)

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SOLUTIONS FOR DVB-S2X WIDEBAND TRANSMISSION





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AT A GLANCE

Convinced of the commercial viability and the possible throughput gains of true wideband transmission over satellite, Fraunhofer IIS and its partners are engaged in developing wideband-capable equipment. Further performance optimizations of the wideband single-carrier transmission enable the demonstration of ultra-high end-to-end net throughput of up to 1 Gbit/s per link.

Improved and newly devised techniques for single carrier operation mode are employed based on the DVB-S2X standard. Wideband transmission allows for gains in efficiency and throughput due to statistical multiplexing of different services. Throughput and reliability optimizations are achieved by providing control feedback to the signal modulator. Furthermore, single carrier transmission offers valuable power efficiency suitable for power-limited satellite amplifiers when compared with operation with multiple carriers per transponder.

The developed key technologies are suitable for the next generation of high speed IP-based broadcast and broadband access in future Ku/Ka-band or Q/V band satellite systems with wideband transponders.

TECHNICAL COMPONENTS

Fraunhofer IIS develops high-quality equipment for satellite signal reception, demodulation, and decoding as well as for monitoring and measurement. The portfolio comprises customized firm- and software solutions:

RF/IF frontend and ADC module

- L-band input with sub-band selection
- High-speed 12 bit ADC with up to 4 Gsps
- Modular architecture suitable for customization

Demodulator (FPGA-based)

- Conform to DVB-S2X Annex E specification: super-frame format 4, time slicing, low roll-offs
- Seamless symbol rate adjustment: 30 – 400 MHz
- Coverage of large SNR range down to –10 dB

FEC decoder (FPGA-based)

- High-speed decoding with up to 500 Mbit/s net throughput per instance
- Scalable implementation as stand-alone IP core
- Support of DVB-S2 and DVB-S2X modulation and coding

Monitoring and control unit

- Automated control of end-to-end transmission chain
- Live performance monitoring and measurements

TRANSMISSION SYSTEM CONCEPTS

Part of our research and development activities is carried out within the scope of projects for the European Space Agency ESA. These projects are dedicated to the design and validation of cutting edge transmission system concepts:

Wideband direct to home testbed

The DVB-S2X end-to-end testbed enables equipment interoperability and performance validation under configurable satellite channel conditions. The testbed supports the transmission of multimedia content with up to 1.5 Gbit/s net data rate in maximum 500 MHz bandwidth.

Demonstration of 1 Gbit/s end-to-end over satellite

Ultra-high throughput transmission over a satellite wideband transponder in Ka-band is based on enhanced equalization techniques and ACM/VCM operation. The testbed is reused for functionality and performance tests before going on air.

Beam hopping

Further enhancement and adaptation of modulation and demodulation is required to enable beam hopping techniques: traffic shaping and synchronization to the beam switching pattern at the transmitter side as well as processing of bursty input data at the receiver side.