

# Integrated Photonic Broadband Radio Access Units for Next Generation Optical Access Networks

CONSORTIUM AREA

## »STReP IPHOBAC-NG Homepage

- »Start
- »Contact
- »Introduction
- »News & Events
- »Press releases
- »Publications
- »IPHOBAC 2006 - 09

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### Hybrid Fiber-Wireless (HFW)

#### IPHOBAC-NG succeeds in delivering optical 2.5 Gbit/s GPON over the air

Everywhere in the world, operators are working to offer internet access with optical fiber speed to more and more homes. The key targets of the European IPHOBAC-NG project are to develop Hybrid Fiber Wireless (HFW) solutions for enabling wireless access with fiber-like speeds. [\[>more\]](#)



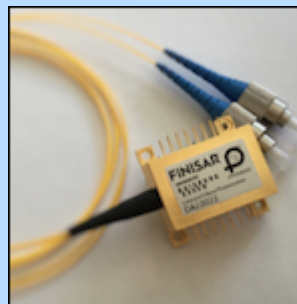
### IPHOBAC-NG at ECOC 2016 Exhibition

From 19th until 21st of September, IPHOBAC-NG exhibited Coherent Radio-over-Fiber (CRoF) systems for next generation optical access and mobile networks. [\[>more\]](#)



### Direct Photonic-to-Radio Converter Technology

IPHOBAC-NG has developed ultra-compact direct optic-to-radio converter modules (CPX) enabling zero-latency and fully transparent conversion of optical baseband signals to E-band radio signals. [\[>more\]](#)



### Field trials for long distance GPON extension performed

ORANGE Polska, Siklu, Finisar, and UDE conducted a pilot test of a prototype radio link system for GPON. This technology will allow in a few years to replace fiber by a millimeter-wave radio link capable of transmitting data rates of up to 10 Gb / s. [\[>more\]](#)



## MWP 2015 Best Paper Award

Rattana Chuenchom, currently enrolled at the University of Duisburg-Essen as PhD Student, has been awarded at the MWP 2015 the prize for the Best Overall Paper for her work entitled "Integrated 110 GHz Coherent Photonic Mixer for CRoF Mobile Backhaul Links". [\[>more\]](#)



## Innovations in IPHOBAC-NG

For providing wireless access in a next generation optical access (NGOA) network supporting 1–10 Gb/s per client, coherent detection for high sensitivity and long reach, dense WDM and high split, as well as centralized electronic signal processing in the optical line termination are necessary to mitigate distortions and to achieve low costs.

Purely electronic radio access units (RAUs) exploiting “simple” o/e-baseband-detection and subsequent electronic RF up-/down-conversion cannot support such broadband wireless access in NGOA at all. Nor will fiber-optic digital Radio-over-Fiber (RoF) be a solution, as data rates and/or carrier frequencies go up.

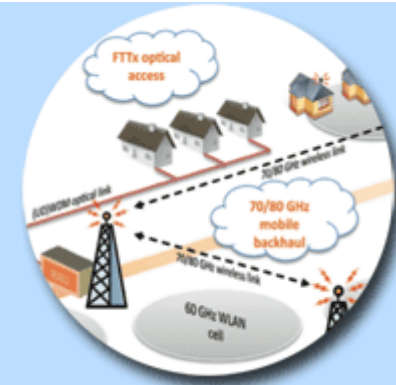
For real broadband wireless access, IPHOBAC-NG will develop the next generation of photonic millimeter-wave radios (PMWR) providing seamless integration in NGOA networks.

The IPHOBAC-NG photonic RAUs:



## Scope of IPHOBAC-NG

To enjoy sustainable economic and social benefits, it is of utmost importance that advanced broadband networks and applications are available to all European businesses and consumers to assure “comprehensive availability and take-up of fast and ultra-fast internet”.



Fiber, in particular point-to-point fiber development, is the most “future proof” network technology to reach the above mentioned targets and deliver next generation access. In Europe, however, most of all rural homes are still waiting for next generation access (NGA) to come. IPHOBAC-NG aims at changing this situation by developing novel photonic components and sub-systems providing broadband wireless access.

This will be achieved by developing application-specific lasers, optical modulators and detectors to construct novel photonic millimeter-wave radios (PMWR) for providing

- a) complementary 1–10Gb/s wireless access and
- b) 3 Gb/s mobile backhaul,

both being seamlessly integrated in next generation optical access networks using WDM Technology.

## IPHOBAC-NG Expertise

The IPHOBAC-NG partners are highly experienced and complementary, providing synergetic expertise in the fields of optical networks, wireless systems, and photonic components.

- ▶ will support coherent optical detection
- ▶ will support reconfiguration of the optical channel allocation
- ▶ will not have an impact on the digital signal processing in the ONT and ONU
- ▶ will be energy-efficient
- ▶ will be fully integrated and very compact

Optical and wireless network expertise is brought into the consortium by Orange, one of the leading European network operators. On the physical level, the world's largest supplier of photonic components, Finisar, and the world's number one in millimeter-wave wireless system deployment, Siklu, are cooperating with one of the leading providers for InP photonic integrated circuits, III/V-Lab. The project's expertise is completed by three foremost Universities, each leading in its respective field. University Duisburg-Essen, which is coordinating IPHOBAC-NG, brings in its huge clean room facilities and experience in photonic InP technology and RF integration. University College London supports with its excellent optical system testing facilities. Finally, experience in DSPs and signal processing is contributed by Denmark's Technical University.

