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BEYOND 5G – OPTICAL NETWORK CONTINUUM
(H2020 – Grant Agreement № 101016663)

Deliverable D6.1

Year 1 report on communication, dissemination and standardisation activities

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REVISION HISTORY

Revision	*Date*	*Responsible*	*Comment*
1.0	*October, 24, 2022*	*Antonio Napoli*	*First draft*
1.1	*December, 15, 2022*	*Lutz Rapp*	*Quality check*
1.2	*December, 16, 2022*	*Antonio Napoli*	*Final*

Abstract

The B5G-OPEN WP6 activity is intended to exploit the research and development activities performed by the project partners and leverage the defined B5G-OPEN network architecture, enabling technologies and solutions to be developed. The D6.1 – entitled "Year 1 report on communication, dissemination, and standardisation activities" summarizes the activities carried out within the first year of the project with regard to the three mentioned activities.

The activities of WP6 (project dissemination and exploitation) include the following objectives (i) creation of the project knowledge site; (ii) developing initial dissemination strategy plans and methods for project dissemination and exploitation; (iii) enabling the communication plan and method across the B5G-OPEN partners, collecting and documenting standards development efforts from B5G-OPEN partners; and (iv) development of an external education plan for defining B5G-OPEN key technologies.

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GLOSSARY

Abbreviations/Acronym	*Description*
5G-PPP	5G Infrastructure Public Private Partnership
ACP	Asia Communications and Photonics Conference
AR	Augmented Reality
CA	Consortium Agreement
CAM	Connected and Automated Mobility
CAPEX	Capital Expenditure
CLEO	Conference on Lasers and Electro-Optics
CSNDSP	International Symposium on Communication Systems, Networks and Digital Signal Processing
DRCN	International Conference on the Design of Reliable Communication Networks
ECOC	European Conference on Optical Communication
EuCNC	European Conference on Networks and Communication
ETSI	European Telecommunication Standards Institute
FGCS	Future Generation Computer Systems
GLOBECOM	Global Communications Conference
IETF	Internet Engineering Task Force
JLT	IEEE/OSA Journal of Lightwave Technology
JOCN	IEEE/OSA Journal of Optical Communication and Networks
KPI	Key Performance Indicator
LATINCOM	Latin-American Conference on Communications
MSA	Multi-Source Agreement
NG-PON2	Next Generation – Passive Optical Network 2
NFV	Network Function Virtualization
NFV-SDN	Network Function Virtualization and Software Defined Networks
OFC	Optical Fiber Communications Conference and Exhibition
ONDM	Optical Network Design and Modelling
ONF	Open Networking Foundation
PSC	International Conference on Photonics in Switching and Computing
QMR	Quarterly Management Report
SB	Steering Board
SC	Steering Committee
SDN	Software Defined Networks
SDO	Standards Developing Organization
SME	Small and Medium-sized Enterprise
SONIC	Software for Open Networking in the Cloud
SUM	IEEE Photonics Society Summer Topicals
TB	Technical Board
TAPI	Transport API
TC	Technical Committee

TIP	Telecom Infra Project
VIM	Virtual Infrastructure Management
VR	Virtual Reality
WG	Working Group
WP	WorkPackage

EXECUTIVE SUMMARY

This document presents a detailed summary of the B5G-OPEN results in terms of dissemination and standardisation activities during the first year of the project.

It describes the organization, the methodology and tools used to enable a rapid and efficient coordination of the work of the workpackage 6 (WP6). Dissemination is reported in details. WP6 does not only coordinate the communication and dissemination – either through education activities, scientific publication, and contributions to standardisation – but also helps to disseminate knowledge via social media and newsletters. WP6 is divided in several tasks, including: (i) realization of transfer of knowledge by allowing open-access to its publications; (ii) coordination of publications at the main conference and workshop, including also preparation of proposals for event, special issues on the leading magazines, etc.; (iii) contribution to white papers and newsletter;

iv) active participation to standards and multi-source agreements (MSAs); (v) when possible, coordination of the work within open-source projects; (vi) interaction and leadership of 5G PPP related initiatives; (vii) coordination of joint-publications as outcome of the main technical deliverable on high-impact factor magazines. This last is an initiative of the WP6.

The overall first year of WP6 on Dissemination and Standardisation achievements of B5G-OPEN have been outstanding across: conferences, journals, workshops, and 5G-PPP. Work on standards and MSAs has started recently.

Document Structure

This document is structured as follows.

In the **introduction,** the main objectives of the project and how to achieve them are discussed, with a short report on the overall status of the project and next steps. The role of WP6 is also described.

Next, **internal dissemination** is discussed, by outlining the processes and software tools used within the project, including for communication and dissemination process, and tracking. As consortium, we decided to use SharePoint to store all needed and produced documentation.

External dissemination refers to the work carried out to disseminate our scientific activities, ranging from articles, posts on social media, the project website, blogs, newsletters, participation at conferences, workshops and education events). It is meant to guarantee a consistent and effective method to spread B5G-OPEN results among the industrial and scientific communities.

The contribution to standardisation is also an important outcome of B5G-OPEN. The B5G-OPEN partners are actively involved in MSAs, standardisation bodies, 5G-PPP initiatives. Herein, we are proposing new specifications and standards and contributing to existing standards. These contributions will translate into proposals (including requirements, architecture, use cases, and specifications as analysed within the project) in variety of technical areas.

1 INTRODUCTION

Nowadays, it might be difficult to imagine a world without the Internet and telecommunication services. These innovations have helped the humankind in an uncountable number of areas, thus helping the economical and societal growth of the planet. Recently, we have experienced the importance of the Internet as we were able to preserve important activities such as schooling, researching, working, etc. during the COVID pandemic. Optical communications represent the foundation of the entire Internet and it will be even more needed to help innovation such as 5G/6G, Internet of Things, virtual- / augmented-reality (VR/AR).

The growth of IP data traffic shifted from backbone networks to metro-access ones. Here, solutions that simplify the rapid deployment of systems – in a flexible and modular manner – and that enable at the same time to cope with large capacity are needed. This represents the core of the investigation within B5G-OPEN, which aims at designing an end-to-end solution – from 5G/6G in access to multi-Tbit/s elastic core networks – that will be the base for the realization of next generation optical networks. Topics such as multi-band, cost-effective, energy-efficient, optical aggregation, dynamic bandwidth allocation, scalability and software configurable networks will represent the outline the work carried out in B5G-OPEN.

To facilitate the dissemination in B5G-OPEN and contribution to standards and initiatives such as 5G-PPP, we provide a series of internal and external tools, processes, and plans. Among the tools, it is worth to mention the internal integrated SharePoint platform and the external website. We also made usage of social media (e.g., LinkedIn, Twitter, YouTube).

The dissemination generated by B5G-OPEN during the first year exceeds the forecast in terms of the number of publications. We delivered high-quality articles and participated in workshops at the top conferences. Furthermore, a significant effort will be made to target joint high-impact publications by the project partners as outcomes of the key-deliverables. In addition, we are actively pursuing strategies to expand dissemination also by proposing special issue on the top magazine on

topics related to the one investigated in B5G-OPEN. B5G-OPEN is also active in standard, MSAs and bodies such as 5G-PPP.

2 INTERNAL DISSEMINATIONS

2.1 ADMINISTRATIVE INFORMATION AND TOOLS

2.1.1 Basic Support for Cooperative Work: TEAMS as online repository and live communication tool

As described in D1.1 "*Project Reference Manual",* the main method and workspace used for collaborative work and support is MS TEAMS. Fully maintained by the Project Coordination team, MS TEAMS is currently being used for:

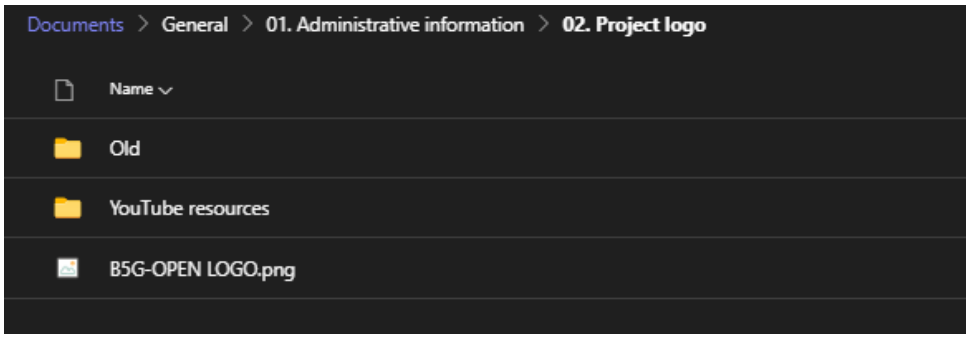
- Storing information and documents of the project.
- Live communication among partners, enabling them to communicate to one another immediately by using the chat option.
- Setting up online consortium meetings.

Exact details of the structure and folders are provided in D1.1. By the time this deliverable is being submitted, no further changes in the structure have been implemented.

2.1.2 Project Logo

The project logo image file can be downloaded from TEAMS and every partner has the necessary rights and permissions to properly make use of it for dissemination activities:

Access via TEAMS: https://telefonicacorp.sharepoint.com/:i:/r/sites/B5G-OPEN.TMEHI/Shared%20Documents/General/01.%20Administrative%20information/02.%20Project%20logo/B5G-OPEN%20LOGO.png?csf=1&web=1&e=RJgVgc



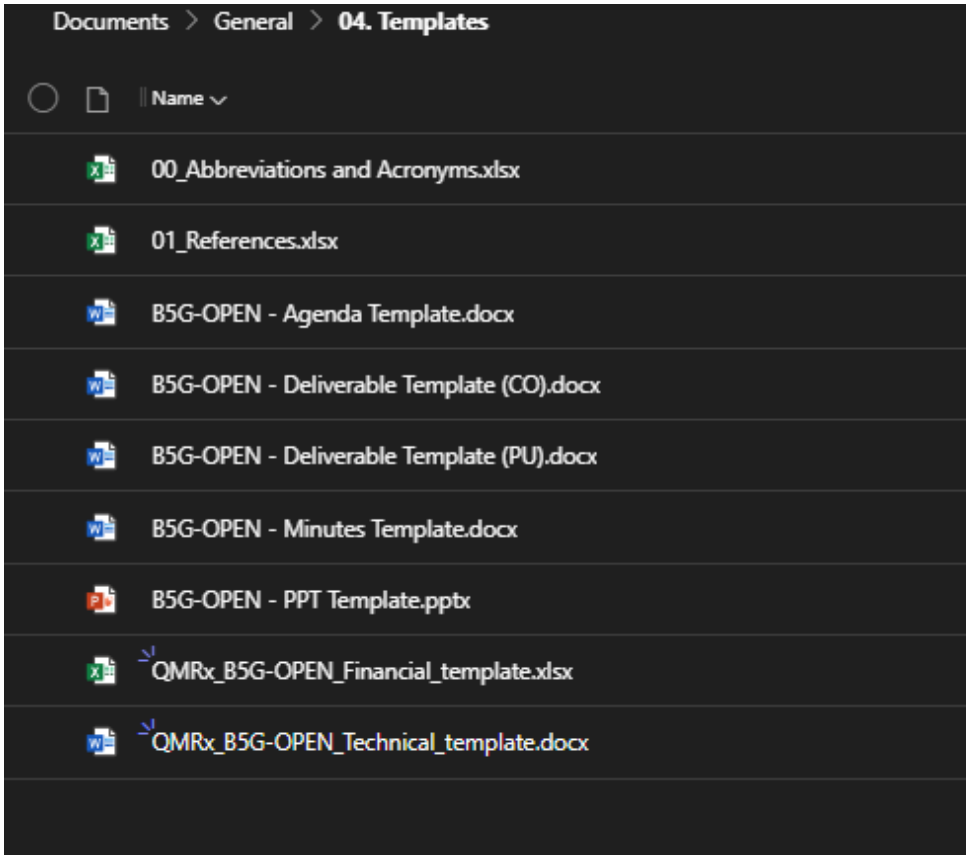
2.1.3 Project Templates

The Project Coordination team has provided the consortium with common templates for the production of project-related documents such as:

- Deliverables and Milestones – Both Public and Private.
- Quarterly Management Reports (QMRs) -- Both Financial and Technical.
- Agenda for internal meetings

- Minutes of meeting.
- Presentations.
- Abbreviations and Acronyms often used in the project.
- Database for common references.

Access via TEAMS



2.1.4 File Naming Conventions

For easier file version tracking, project members have been instructed to follow the file naming convention as shown below:

- Deliverable filenames: “B5G-OPEN_DX.Y_vA.B_DDMMYY.doc”
- Milestone filenames: ”B5G-OPEN_MSX.Y_vA.B_DDMMYY.doc”
    - “X.Y” - Index number of the deliverable/milestone.
    - “A.B” - Version number. E.g., “0.1”.
    - Followed by the issue date (DDMMYY).

In any case, final versions will always be tagged with the word “FINAL” at the end.

2.1.5 Acknowledgement Text for Publications

As per article 29.4 of the Grant Agreement, the following text shall be used by all consortium members

> *“This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101016663“* – Acknowledgement Text for Standards Contributions

As per article 28.2 of the Grant Agreement, the following text shall be used by all consortium members for Standards Acknowledgement sections

"Results incorporated in this standard received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101016663"

2.1.6 Current Mailing Lists

A set of internally accessible (by project members) mailing lists are available during the project. These are outlined in the table below and may be subscribed to via specific requests to Project coordination teams.

As described in D1.1, The Project Coordination is responsible for creating and managing the following mailing lists

- General mailing list: general.b5g-open@tid.es
  - General communications that are of importance to all partners.
- Legal mailing list: legal.b5g-open@tid.es
  - Legal communications (including the consortium agreement (CA) negotiation) that are of importance to all legal counsels from every partner.
- Admin mailing list: admin.b5g-open@tid.es
  - Administrative communications that are of importance to all administrative teams from every partner.
- WP1 mailing list: wp1.b5g-open@tid.es
  - WP1-related communications that are of importance to all WP1 contributors.
- WP2 mailing list: wp2.b5g-open@tid.es
  - WP2-related communications that are of importance to all WP2 contributors.
- WP3 mailing list: wp3.b5g-open@tid.es
  - WP3-related communications that are of importance to all WP3 contributors.
- WP4 mailing list: wp4.b5g-open@tid.es
  - WP4-related communications that are of importance to all WP4 contributors.
- WP5 mailing list: wp5.b5g-open@tid.es
  - WP5-related communications that are of importance to all WP5 contributors.
- WP6 mailing list: wp6.b5g-open@tid.es
  - WP6-related communications that are of importance to all WP6 contributors.
- SC mailing list: steering-committee.b5g-open@tid.es
  - Communications of importance to the Steering Committee (SC).
- Technical Committee (TC) mailing list: technical-committee.b5g-open@tid.es
  - Communications of importance to the TC.

3 External Disseminations

For a complex project such as B5G-OPEN with a wide set of partners, the managed dissemination activities ensure that publications, tasks and objectives are adequately planned and delivered.

This should avoid inferior quality publications and inefficient use of time and resources. It is also important to avoid partial or missed tasks and objectives.

The project dissemination and standardisation effort are split into the following sub-level areas: industry dissemination, scientific dissemination, specification, and standardisation.

To achieve quality publications across the areas mentioned we use a set of processes and tools, a variety external platforms and channels, and social media platforms, to disseminate our output to the industry, academia and public.

The rest of this section describes the strategy for external project dissemination, including:

- External dissemination process and tools
- External dissemination methods and channels
- External workshops and education events.

3.1 PROJECT WEBSITE

3.1.1 Website Structure

The project public area is accessible for any Internet user. The website (https://www.b5g-open.eu/) is mainly managed and updated by CNIT, leveraging on content provided by WP6 contributors.

The project site is split into seven major areas with sub-areas for each section:

- HOMEPAGE. The frontpage of the website.
- PROJECT. Provides a project overview.
- CONSORTIUM. Lists all the Project Partners providing links to their web resources
- DISSEMINATION AND EXPLOITATION. Includes two sub-areas: dissemination results such as conference and papers and deliverables.
- NEWS. Reports the relevant events and achievements of the Project
- CONTACTS. The website (https://www.b5g-open.eu/contacts/) allows submission of contact requests, providing a contact email (info@b5g-open.eu) that is forwarded to WP6 leader, Project Coordinator and Technical Manager.
- MEMBERS AREA. Private Area for internal collaborative activities.

Fig. 3.1 Project web site - Home page

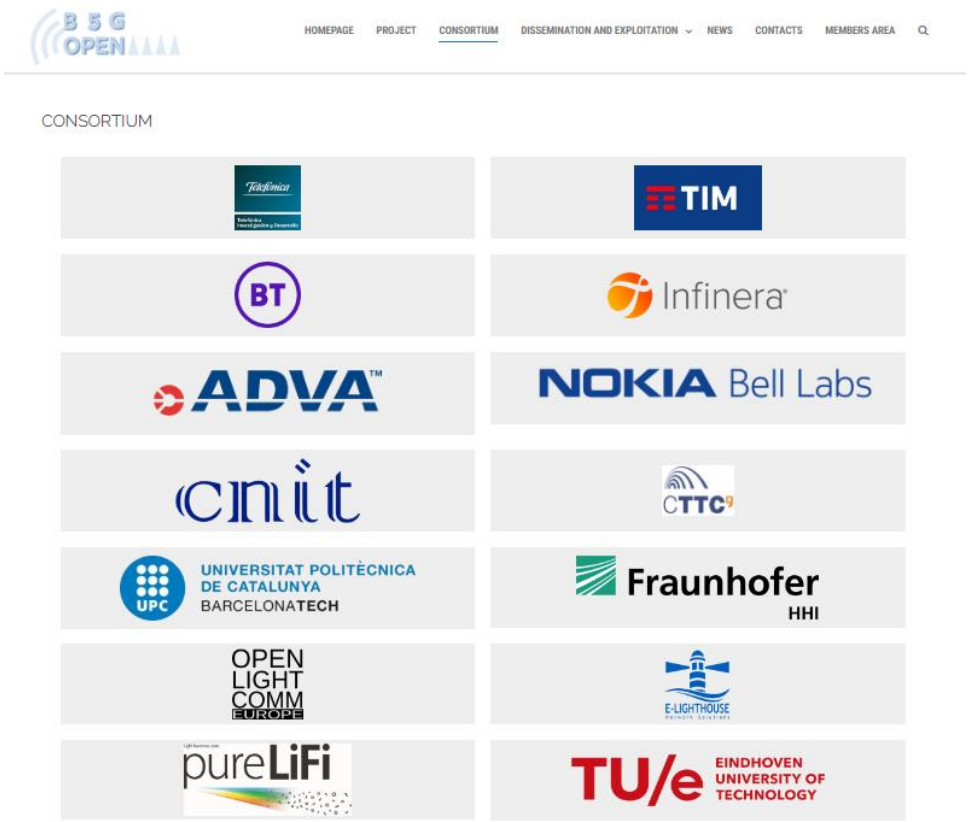


Fig. 3.2 Project web site - Consortium

3.2 Dissemination Activities

3.2.1 Internal Dissemination Coordination

The project so far had four plenary sessions:

1. November 2021, as an online meeting (Kick-off)
2. January 2022, as an online meeting
3. May 2022, in Madrid, Spain
4. October 2022, in Barcelona, Spain

These plenary sessions provided an opportunity for internal dissemination. In particular during the third and fourth sessions, project partners could meet personally and discuss in length the relevant topics. In addition to these sessions, multiple online conference calls allowed partners to be periodically updated with regards to project advancements.

3.2.2 External Dissemination Coordination

Concerning dissemination to external channels, posts to multiple different platforms are targeted to reach a broad audience. Such platforms include, but are not limited to, social media, the project website, blogs, newsletters, news articles and press releases. The published information should provide updates based on the research output of the project partners. The coordination also encourages partners to submit articles to any relevant scientific journals, peer-reviewed conferences, and books, solidifying the presence of the project within those mediums to reach a broader audience.

3.3 Project Dissemination Plan

The project dissemination plan covers diverse periods of the project.

Period 1: includes the creation of the project website increasing the visibility of the project; the definition of the dissemination strategy document(s); the identification of which SDOs to target for B5G-OPEN proposals; reporting the first architecture approach, identifying the principal research challenges; and the creation of the project education programme, appropriate for industry and academia (MSc and PhD programs).

Period 2: Publication of early findings in scientific journals; create new education resources scoping the solution and involved technologies; the submission of first technical reports to SDO with more precise and specified solutions; continuous development and industry collaboration of SDO proposals; participation with the project education programme in workshops, webinars and lectures on MSc and PhD programs.

Period 3: Publication of techno-economics data, infrastructure, experiments, services and applications, demos, and other relevant knowledge; formal adoption of specification and standards, and publication as standards.

3.3.1 Planned Scientific Publications

The B5G-OPEN project considers two main methods to disseminate scientific results: conferences and publications

Conferences: The B5G-OPEN project will participate and present the knowledge, results, and key innovations at academic and industry conferences.

Publications: The B5G-OPEN project expects to publish over 5 publications in journals, 10 articles, magazines, whitepapers, specifications, and standards, that highlights the scientific and industry technology leadership.

3.3.2 Organisation of Planned Events

During the project duration, the B5G-OPEN partners participate in several activities. Some of these activities are planned from the beginning, and outstanding events should be required according to the course of the project.

Project Workshops: The partners will demonstrate the results of the project with best practices and successful studies, applications, functions, and services tested within the B5G-OPEN framework and overall 5G PPP community. They will contribute to demonstrating the value of B5G-OPEN across all European ICT innovators.

Joint 5G PPP workshop and sessions: The project will participate in the presentations and exhibitions in the 5G PPP events including Optical Fiber Conference (OFC), 5G Global events, European Conference on Networks and Communication (EuCNC), European Conference on Optical Communication (ECOC), etc.

3.4 Project Dissemination Objectives

The dissemination plan is designed to maximize the external knowledge of B5G-Open proposal in order to influence network operators, equipment vendors, Small Medium Enterprises (SMEs), and the research organizations to adopt and exploit the proposed architectures and technologies. This will be achieved with a thorough dissemination of the project outcomes to relevant industry and scientific communities through:

• Scientific dissemination in conferences (industry and academic) and academic journals. We expect to publish over forty journals, magazines, whitepapers, specifications, and standards (Table 1);

• Organization of events such as: B5G-OPEN Workshops and joint 5G PPP workshop/sessions;

• Educational activities for students moving to industrial roles to promote the development of skills and knowledge necessary to design, build and deploy the B5G-OPEN infrastructure;

• Standardisation and Open-Source activities to significantly impact SDOs (Table 2);

• Dissemination with the 5GPPP by participating in Steering Board activities, where program level decisions will be taken on actions to achieve the objectives of the program.

Table 1 – Summary of targeted Yearly dissemination activitiesand verification

Dissemination Activity and Verification Plan	Year 1	Year 2	Year 3
Publication in selected peer-reviewed Journals	5	10	10
Presentation and Publication at selected conferences	10	15	15
Organization of Workshops/Symposia	-	1	1
Participation at industry conference/workshops/events	1	1	2
Contribution to SDOs (different WG contributions)	1	2	2

Table 2 – Standardisation and Open-Source activity plan

Standardisation	By completion of the Project
SDO contributions (individual drafts, documents, interop reports, best practices, and applicability documents)	4+ contributions.
Contributions to Open-Source projects, including code, documentation, bug fixes, features, and testing reports.	Contributions to at least 2 Open-Source projects.

3.5 5G-PPP

3.5.1 Introduction, background and signature of the 5G-PPP Collaboration Agreement

The 5G-PPP is defined on https://5g-ppp.eu/ as, quoting,

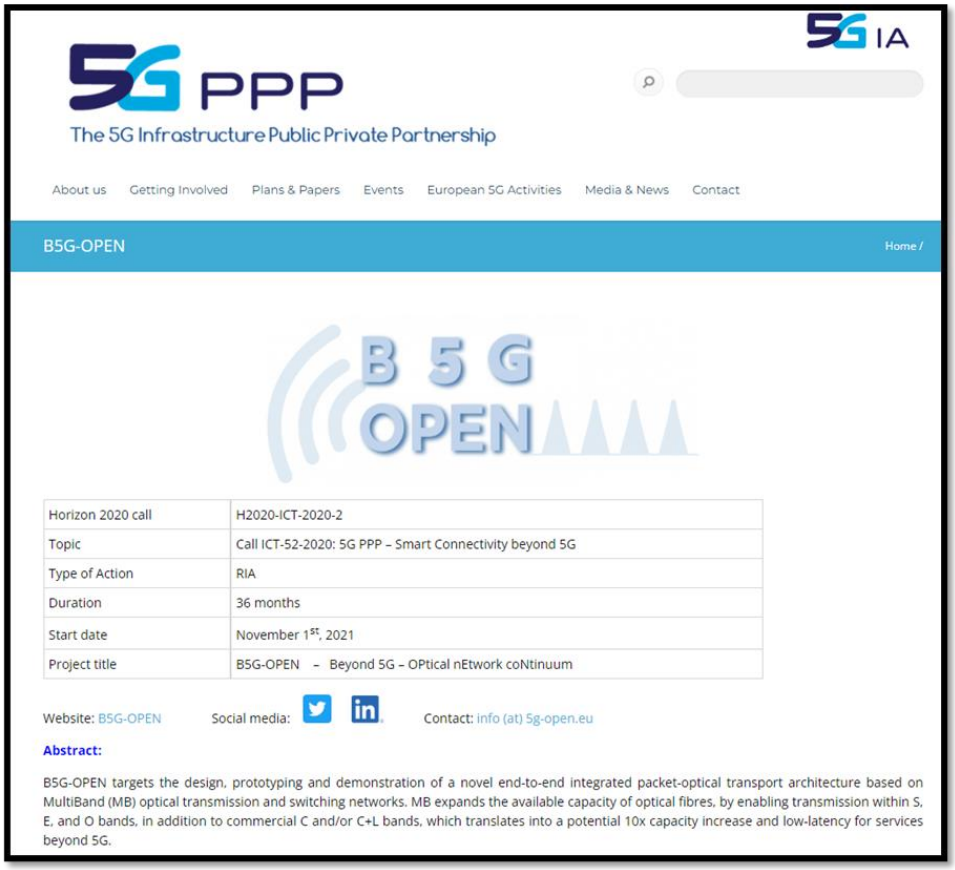
"a joint initiative between the European Commission and European ICT industry (ICT manufacturers, telecommunications operators, service providers, SMEs, and research Institutions). The 5G-PPP aims to deliver solutions, architectures, technologies, and standards for the ubiquitous next generation of communication infrastructures for the coming decade. The challenge for the 5G-PPP is to secure Europe's leadership in the areas where Europe is strong or where there is potential for creating new markets such as smart cities, e-health, intelligent transport, education, or entertainment & media. The 5G-PPP initiative also plans to reinforce the European industry to successfully compete on global markets and open innovation opportunities. It will "open a platform that helps us reach our common goal to maintain and strengthen the global technological lead".

B5G-OPEN belongs to the last stream of projects aiming at responding to the call *"5G-PPP ICT-52-2020: 5G-PPP Smart Connectivity beyond 5G"* and was the last project to effectively join the 5G-PPP community due to the late notification of funding compared to the rest of the projects responding to the same call. Indeed, among all the projects funded under the same call, B5G-OPEN was the only one with a late start. All of them started on January 1st, 2021, while B5G-OPEN started on November 1st, 2021.

Right after the communication of funding, the Project Coordination team of B5G-OPEN initiated conversations with 5G-PPP to sign the 5G-PPP Collaboration Agreement. This is a program level collaboration agreement aiming at enabling consortium members of the project to comply with Clause 41.4 of Grant Agreement (Relationship with complementary beneficiaries – Collaboration agreement) and hence, harmonize collaborations with rest of consortia already existing in the 5G-PPP.

After the last signature of the 5G-PPP collaboration agreement, B5G-OPEN was added to the 5G-PPP website and a specific e-mail was also assigned to the project:

- ✓ 5G-PPP website: https://5g-ppp.eu/b5g-open/
- ✓ B5G-OPEN 5G-PPP e-mail: b5gopen-contact@5g-ppp.eu.



All B5G_OPEN partners have been informed about the contractual commitment of the 5G-PPP as well as its organizational structure. Indeed, all partners have acknowledged the roles and commitments of the European Commission, the 5G-PPP partnership board, the 5G Infrastructure Association, and the 5G for Europe and commit to constructive interactions with these bodies as part of B5G-OPEN research and impact activities.

3.5.2 B5G-OPEN 5G-PPP representatives and participation in working groups (WGs)

This section describes in detail those activities performed by the B5G-OPEN partners and representatives in each of the working groups (WGs) as part of the 5G-PPP related activities.

Aiming at exploiting synergies and enhancing collaboration with 5G-PPP projects as well as participating in joint dissemination activities while actively contributing to the different WGs, the following representatives were allocated to each one of the 5G-PPP WGs:

5G-PPP WG	**Main representative**	**Partner**	**Second representative**	**Partner**
Vision and Societal	Javier Garcia	TID	Alexandros Stavdas	OLC-E
TMV KPIs	Emilio Hugues Salas	BT	Vangelis Kosmatos	OLC-E
Trials	Oscar González	TID		
Sofware Networks	Ramón Casellas	CTTC	Behnam Shariati	HHI
5G Architecture	Albert Rafel	BT		
Pre-standarization	Antonio Napoli	INF-D		

Goals and main objectives for each of the WGs are detailed below as follows:

- ✓ Vision and Societal Challenges WG: This specific WG aims to develop a consensus in Europe on 5G systems, infrastructures, and services as well as to identify the societal, economic, environmental, business, and technological benefits that can be obtained from the realization of 5G implementation.
- ✓ Test, Measurement and KPIs Validation: 5G network will bring new services and technologies, and therefore it will be required to evaluate the 5G related KPIs accordingly. The purpose of the Group is to bring together the projects that have common interest in topics towards the development of Test & Measurements and validation methods, test cases, and procedures that can support the verification of the KPIs.
- ✓ Trials WG: The WG was launched to develop the European Trial Roadmap based on the 5G Manifesto. The scope of the activities is threefold:
  - To facilitate the involvement of verticals in the trial's roadmap.
  - To discuss and define business principles underpinning the economic viability of trials.
  - To consider and coordinate the activity on trials with other relevant initiatives at international level.
- ✓ Software Networks WG: The objective of this WG is to analyse the applicability of research topics towards Software Defined Networks (SDN) and Network Function Virtualization (NFV) and foster the development of related activities by the 5G-PPP projects.
- ✓ 5G Architecture WG: The goal of this WG is to serve as a common platform that will facilitate the discussion between 5G-PPP projects developing architectural concepts and components as well as promote any discussions based on the KPI's as described by 5GPPP.
- ✓ Pre- Standardisation WG: This WG focuses on developing a roadmap of relevant standardisation and regulatory topics for 5G by identifying the standardisation and regulatory bodies to align with e.g. ETSI, 3GPP, IEEE and other relevant standards bodies such as ITU-R and WRC, as well as evaluating roadmaps in international level.

Indeed, the work being performed in the above mentioned WGs falls under the same scope and objectives as B5G-OPEN and they are therefore all of interest for the project.

The consortium also develops interactions with the 5G-IA governing bodies (i.e., Steering Board and Technical Board) by keeping an active communication and regularly attending meetings calls.

5G-PPP Governing body	Main representative	Partner	Second representative	Partner
Steering Board (SB)	Javier Garcia	TID	Oscar González	TID
Technical Board (TB)	Filippo Cugini	CNIT	Oscar González, Alexandros Stavdas	TID, OLC-E

- 5G-PPP Steering Board: It consists of mandated representatives of each 5G-PPP project who are people with the responsibility to decide on common actions and initiatives of the programme.

- 5G-PPP Technical Board: The technical board addresses the inter-working of the technical solutions developed within the projects and also ensures coherence and consistency across the programme.

3.5.3 B5G-OPEN contributions to 5G-PPP

The late notification of funding in comparison with the rest of the ICT-52 projects had an impact on the volume of contributions that could have been expected from the project in the first place. While the project is closely monitoring the work done in each one of the WGs and attending regular calls, it is worth mentioning that the late notification of funding forced project representatives to make extra efforts to increase visibility of the project within the 5G-PPP community.

Nevertheless, project 5G-PPP representatives joined progressively the already existing discussions in 2022 and, even though some of them were really advanced in terms of inputs expected and maturity of conversations, B5G-OPEN's inputs are extensively recognized as cornerstones for the next 5G-PPP activities. Indeed, B5G-OPEN is currently the only project able to provide contributions and inputs concerning the development of optical networks.

3.5.3.1 Contributions to 5G-PPP white papers and WGs

In 2022, 5 white papers are being issued by the 5G-PPP:

- Softnet WG: *"Network Applications: Opening up 5G and beyond networks"*
  - B5G-OPEN does not participate in this WG as it does target inputs from ICT-52 projects.
- CAM WG: *"From 5G to 6G Vision – A Connected and Automated Mobility (CAM) perspective"*
  - B5G-OPEN does not participate in this WG as it does target inputs from ICT-52 projects.
- Test, Measurement and KPIs Validation WG: *"Beyond 5G/6G KPIs and Target Values"*
  - B5G-OPEN is currently providing contributions to the definition of the 6G KPIs that are being defined in the context of the white paper. By the time, this deliverable is being submitted however, the WG is currently deciding whether the activity in the white paper shall continue with the production a new white paper or via the creation of a subsequent version (version 2.0).
- Test, Measurement and KPIs Validation WG: *"5G PPP – Basic Testing Guide: A Starter Kit for 5G KPIs Verification"*
  - B5G-OPEN did not provide inputs to the white paper as inputs were required when the project was only 2 months old.
- Societal Challenges WG: *"6G IA – What societal values will 6G address?"*
  - B5G-OPEN did not provide inputs to the white paper as inputs were required when the project was only 4 months old.

Regarding 5G-PPP white papers issued in 2021, there was no chance to provide contributions as the final signature of the 5G-PPP collaboration agreement took place on November 30, 2021. Last 5G-PPP white papers issued in 2021 actually date from November.

- Technical Board (TB):

- Contribution made to the ICT-52 Reference Figure identifying as main 5G-PPP target areas fro B5G-OPEN:
  - Scalable networks for massive connectivity
  - Secure, personalized multi-tenant networks
  - Novel architectures and protocols (AI powered)
  - Optical network infrastructure (primary)
  - Other: Human, EMF, DLT, Governance
- Contribution made to the 5G-PPP KPI cartography, including KPIs.
  - User Data Rate: ~ 10 Gb/s
  - Capacity: 100x offered capacity increase of fixed-line systems compared to NG-PON2.
  - Latency: < 100 µs
  - Mobility: In case of blockage of the line-of-sight link, the auto-reconnection time is < 2seconds
  - Availability: Flow adaptation/control/monitoring capabilities in the microseconds time scale
  - Service Deployment Time: Flow adaptation/control/monitoring capabilities in the microseconds time scale. High level service provisioning (e.g., interconnected cloud native functions and containers) relying on low level service setup performed
  - Energy Efficiency: 40% reduction compared to baseline (2020)
  - Network management CAPEX/OPEX: 50% CAPEX reduction to baseline (2020).

It is also worth mentioning that on October 4 and 5, the first 5G-PPP face-to-face SB and TB meetings took place in Athens and representatives from TID, and OLC-E attended physically to express the commitment of the project t the 5G-PPP.

3.5.3.2 Contributions to 5G-PPP Workshops

- Hexa-X ICT-52 workshop (04/02/2022 - Online): B5G-OPEN participated in the first joint workshop where all ICT-52 projects were invited to share their views and innovative approach to 6G technology. B5G-OPEN contribution was focused on providing the the optical networks perspective and more specifically, how to build an open power-efficient packet-optical white box.
  - Direct access: https://www.youtube.com/watch?v=ozJPRVxCmYs&t=2410s

By the time this deliverable is being submitted, B5G-OPEN has submitted two proposals for the participation in two additional 5G-PPP workshops:

- Joint ICT-52 workshop on 6G (2022 edition – date to be confirmed – Online)
- 6G-IA Workshop @IEEE ICC 2023: “AI/ML driven Autonomous 6G networks” with the following proposal title:
  - ”Real-time Autonomous Optical Network Operation: from Vision to Development in B5G-OPEN”, Specification and Standardisation Activities

The project has been mainly focusing on the theoretical studies in WP2, and therefore there has been no contributions yet. It is expected this will change during the second year of the project.

The partners who are active in Standards are:

- TID and TIM are contributing to TIP MUST
- TIM is contributing to OpenROADM
- BT, TIM and TID are contributing to OpenXR
- CTTC and TID are contributing to ONF TAPI
- TID is contributing to OpenConfig and IETF

4 Dissemination Impact in Year 1

4.1 Disseminations with Publications

4.1.1 Summary

B5G-OPEN has been active in several dissemination activities. Already during the first 12 months, the number of publications has been significantly high. B5G-OPEN partners publish at top IEEE/OPTICA conferences and on the leading magazines. Many partners have been invited to talk at workshop, symposia, and various scientific collaborative events.

4.1.2 Disseminations by Type

The dissemination by type is reported in the next two sections.

4.1.3 B5G-OPEN Presence in Industry Conferences

Table 3 (below) lists (in alphabetical order) the industry conferences where B5G-OPEN had or will have a presence.

Table 3 List of Industry Conference with B5G-OPEN's Presence

Conference or Workshop Name	# Contributions
Asia Communications and Photonics Conference (ACP 22)	1
Conference on Lasers and Electro-Optics (CLEO 22)	1
Conference on Network Function Virtualization and Software Defined Networks (NFV-SDN 22)	1
Conference on Optical Network Design and Modelling (ONDM 22)	4
European Conference on Optical Communications (ECOC 2022)	10
Global Communications Conference (GLOBECOM 22)	2
ICT-52 Workshop on 6G	1
IEEE Photonics Society Summer Topicals (SUM 22)	1
International Conference on Photonics in Switching and Computing (PSC 22)	3
International Conference on the Design of Reliable Communication Networks (DRCN 22)	1
International Symposium on Communication Systems, Networks and Digital Signal Processing (CSNDSP 22)	1
Latin-American Conference on Communications (LATINCOM 22)	1
Optical Fiber Communications Conference and Exhibition (OFC 2022)	4
Optical Fiber Communications Conference and Exhibition (OFC 2023)	18 (submitted)

Visions of Future Communication Summit	1
TOTAL	**50 (18 submitted)**

4.1.4 B5G-OPEN Publications in Journals

The table below lists the scientific journal published or submitted by B5G-OPEN partners.

Magazine title	# Contributions
IEEE / OPTICAL J. of Optical Communications and Networking	10 (4 are submission)
IEEE / OPTICAL J. of Lightwave Technology	5
MDPI Sensors	1
Future Generation Computer Systems (FGCS)	1
TOTAL	**17 (4 submitted)**

4.2 Standardisation Activity

Standardisation bodies active in the field of technology covered by B5G-OPEN have been identified and contact persons from the project that are already contributing to them have been found out. Thus, paths for submitting contributions have been defined.

Relevance of different standards has been checked and project partners have contributed to the following standardisation bodies and activities:

1. ETSI ISG F5G
2. IETF
3. ITU
4. ONF TAPI
5. openConfig
6. openROADM
7. openXR forum
8. O-RAN
9. TIM MUST

Hereafter some examples of contributions:

4.2.1 ETSI ISG F5G

Fraunhofer is involved in the ETSI ISG 5G dealing with the use cases and telemetry work items. Meetings are online and occur on a weekly basis.

4.2.2 IETF

TID is attending the IETF calls on the ACTN PoI (packet over optical). Calls are online and weekly

4.2.3 ITU-T and FSAN

In ITU-T SG15 Q2, TIM is actively involved in activities related to development and maintenance of Recommendations for point-to-point and point-to-multipoint optical access systems. The most known Recommendations are those related to PON systems which are currently at the basis of most FTTH deployments. Q2 is currently finalizing the Recommendations of the most advanced High Speed PON system working at 50Gb/s line rate. In addition, up to 25Gb/s/channel WDM based systems are being specified mainly for mobile backhaul

applications. High rates standardization effort is the natural response to market demand for higher capacity: ITU-T is so working in a joint effort with IEEE to standardize those high speed interfaces.

TIM is actively involved in ITU-T SG15 Q2 activities. Two/three days plenary meetings are held every two months including dedicated workshops for specific topic of interest. Additionally, within FSAN (an interest group born by operators in the middle '90s to facilitate the introduction of fibre in the access network and guide the industry towards standardization), operators like TIM are continuing to address mainly PON's operational issues, energy saving aspects and 5G fronthaul applications.

4.2.4 ONF TAPI North Bound Interface

CTTC is contributing partially thanks to B5G-OPEN as follows:

- Frequency: weekly, can be 2-3 times a week for specific tasks
- Format: online
- Details of the meetings: https://wiki.opennetworking.org/display/OTCC/TAPI+Call-in+Details+and+Notes
- Contributions
  - Definition of Use Cases for the usage of TAPI in Optical networks
  - Definition of TAPI Yang models (2.1.3 and 2.4.0)
  - Editorship of TAPI Reference Implementation Agreement (RIA) 1.1 and 2.0
- Meeting notes and minutes
  - All recorded at: https://wiki.opennetworking.org/display/OTCC/TAPI+Call-in+Details+and+Notes
  - See, for example https://wiki.opennetworking.org/display/OTCC/2022-11-08+TAPI+Meeting+Notes

4.2.5 Openconfig

TID attends the Openconfig South bound calls, which occur online and weekly

4.2.6 OpenROADM

- Telecom Italia has the chairmanship of the consortium.
- In openROADM there are no contributions that can be directly ascribed to a specific EU funded project: the forum takes place in the form of a discussion with contributions – as in many other fora – provided as presentations by the partners on technical aspects or topics to be discussed or explored.
- Two weekly meetings
  - one restricted to aspects of the transmission plan (to update the optical specifications of OpenROADM)
  - Plenary meeting, which is mainly dedicated to updating the models and to all the internal formal aspects of the forum
- The topics covered are closely related to B5G-OPEN. At the moment, there are no working groups that have started yet for the extension to point-multipoint solutions or multiband transmission. With the 12.1 minor release closing at the end of the year, these extension requests will certainly be placed by us in the list of features to be covered in release 13 or later.

4.2.7 OpenXR forum

- 5-6 meetings a year
- TIM, TID and BT are partecipating.
- TIM has mentioned to the consortium its interest in investigating use cases of the metro-aggregation type. In such scenarios, the traffic is naturally hubbed or dual-hubbed and the topologies are often horseshoe-shaped. From reasonable traffic forecasts, it appears that the 25 Gbit/s granularity is quite reasonable for future evolution, given that currently the minimum traffic size is 10 Gbit/s. It seems very reasonable to TIM to consider point-multipoint coherent solutions in this network context.

4.2.8 O-RAN

O-RAN refers to the Open RAN standardized by the O-RAN Alliance (founded in 2018). The O-RAN Alliance has four main objectives: Open Interfaces, Virtualization, Intelligence, and Interoperability. O-RAN enables service providers to deploy radio units (RU) and distributed units (DU) from different vendors with a new Lower Layer Split (LLS) split, called Option 7-2x, transported over eCPRI protocol. The proposed architecture is based on standards defined by O-RAN, which are fully supporting and complimentary to standards promoted by 3GPP and other industry standards organizations. The alliance is now comprised of close to 30 operators and more than 200 vendor companies.

TIM is active at the O-RAN initiative Working Group 9 concerning Open X-haul Transport Work Group. The working group shall focus on the transport domain – consisting of transport equipment, physical media and control / management protocols associated with the transport network underlying the assumed Ethernet interfaces (utilized for fronthaul, mid-haul and backhaul).

This group has already edited several specifications and is working at updated editions and revisions:

- Xhaul Transport Requirements, including contributions from TIM
- Xhaul Packet Switched Architectures and Solutions
- Synchronization Architecture and Solution Specification
- WDM-based Fronthaul Transport, including contributions from TIM
- Management interfaces for Transport Network Elements

When it is not providing original contributions, TIM is active into the global revision and approval process.

O-RAN working groups have regular meetings one a week, within sub-groups for specific actions.

4.2.9 TIP

TIM and Telefonica (TID) are both involved in the MUST Optical workstream. This is carried out with online weekly meetings. TID is also involved in the MUST Hierarchical workstream, in this case online meeting but every two weeks

TID is also working on the MANTRA, which is related to IP over DWDM. Also, online and with weekly calls.

4.2.10 OpenSource Software

A large number of open-source software is used for the work of the different work packages. Furthermore, partners are planning to contribute to open-source software packages such as ONOS SDN. Examples for used software are given in the following list:

- **ONOS SDN** controller for preliminary studies on control plane architecture
- **Openstack** as VIM
- **Kubernetes** as container management system
- **Netopeer** and related software for Netconf prototype testing
- **Docker** to dockerize applications and function
- **Kafka** and **Redis** as telemetry systems
- **Grafana** for dashboard visualization
- **SONIC** as a network operating system for hybric packet-optical nodes
- **Net2Plan** as network planner
- **GNPy** for estimating the power of the non-linear interference
- **BMv2** for emulating a P4-based switch
- open-source operating systems, languages, compilers, and tools
- open-source libraries to develop part of our software (Boost C++ Libraries)

4.3 B5G-OPEN WEBSITE

4.3.1 Main contents

The project website - https://www.b5g-open.eu/ - has been constantly updated.

For example, the NEWS area includes 18 pieces of news, informing the public audience about project events (e.g., plenary meetings), relevant publications (JOCN/JLT journals, OFC/ECOC conference papers), participation to workshops, and disseminations events targeting the broad community (e.g., Italian Internet Festival).

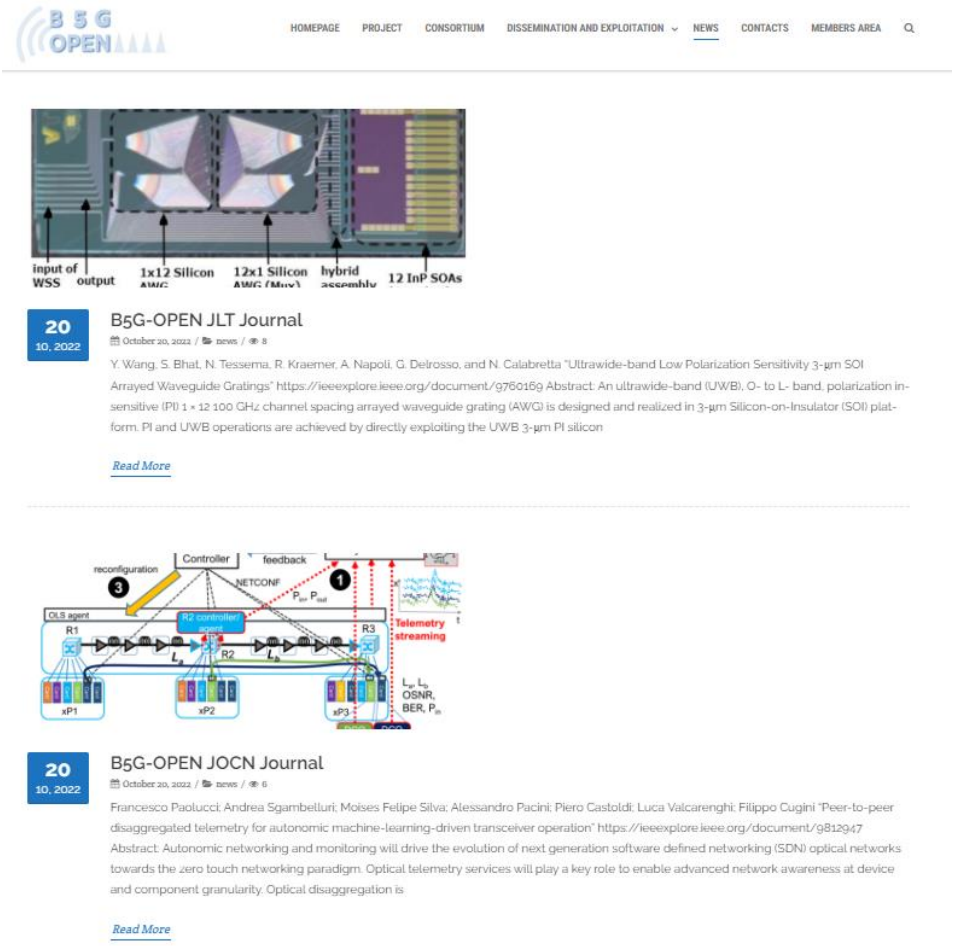


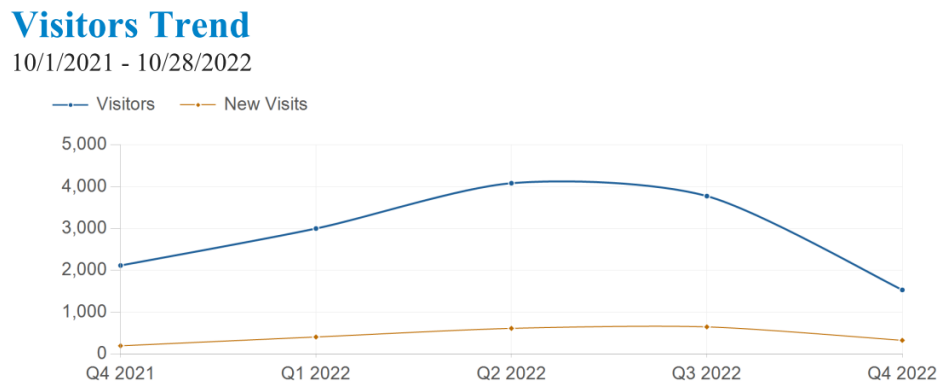
Fig. 4.1. Project website - news

4.3.2 Website statistics

Fig. 4.2 shows the project web site statistics in terms of number of visitors. A remarkable result of more than 14.500 visitors has been achieved during the first year of the project.

This result is even more relevant if compared with the results achieved by other H2020 projects, like H2020 METRO-HAUL which focused on the same topic of optical networking between 2017 and 2020. The METRO-HAUL website registered 1017 visitors during its first year.

Fig. 4.3 shows the daily statistics. It is possible to appreciate peaks of more than 400 visitors in a single day.



Date	Visitors	Unique Visits	New Visits	Return Visits
Q4 2021	2,118	198	198	0
Q1 2022	3,001	441	409	32
Q2 2022	4,084	693	615	78
Q3 2022	3,776	781	650	131
Q4 2022	1,534	457	329	128
Total	14,513	2,570	2,201	369

Fig. 4.2. Project website statistics – visitors

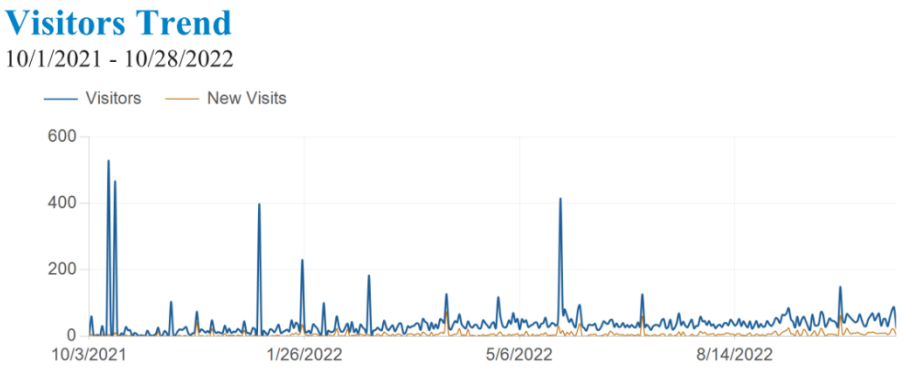


Fig. 4.3. Project website statistics – visitors per day

4.4 Social Medias

In addition to the B5G-OPEN website, we are making large usage of the various social platforms in order to increase the possibilities of dissemination of the project activities.

We selected the following widely used social medias:

- Twitter (@B5G-OPEN)
- YouTube (B5G-OPEN Project - YouTube)
- LinkedIn (https://www.linkedin.com/company/b5g-open/?viewAsMember=true)

Details on the utilizations of these three platforms are provided hereafter.

4.4.1 LinkedIn

LinkedIn is one of the most used social media platforms for professionals and it is the main social media where WP6 actively posts about the project and its member activities, such as organized

workshops as well as any scientific achievement and outreach initiatives. B5G-OPEN has been publishing its scientific achievements, in terms of participation to conferences and publications of the results on the leading journals. On 14th of Nov. 2022, we counted

- 569 page views
- 168 unique visitors
- 53 custom button clicks

with an average of visit per page of 1.6. Fig. 4.4 shows the evolution of visitor over time.

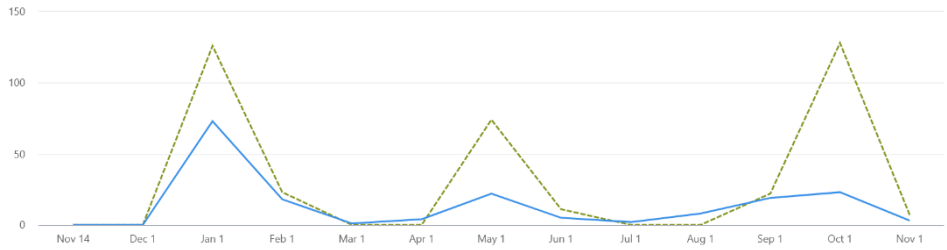


Fig. 4.4. LinkedIn visitors over the last year (Nov. 2021 – Nov. 2022).

4.4.2 YouTube Channel

YouTube is the most-known online video platform, and B5G-OPEN project uses this resource to upload multimedia content. The B5G-OPEN YouTube channel was created in QMR2. As of the writing of this documentation, we currently have two playlists available to public:

- **B5G-OPEN workshop**, including videos from this and other YouTube channels where B5G-OPEN partners participate:
  - ICT 52 Workshop on 6G from the Hexa-X dissemination YouTube channel where Oscar Gonzalez de Dios talks about B5G-OPEN starting at 40:10
- **B5G-OPEN plenary meetings** with videos from face-to-face meeting along the project. At the moment, the available resources are from the 3rd plenary meeting at UPC (Barcelona) the October 18th, 2020.
  - [B5G-OPEN] 3rd Plenary meeting Barcelona (UPC) 2022/10/18 (1)
  - [B5G-OPEN] 3rd Plenary meeting Barcelona (UPC) 2022/10/18 (2)

Note: The previous hyperlinks redirect to B5G-OPEN videos in YouTube.

5 SUMMARY

This deliverable summarizes the activities carried out within the first year of the project on communications, dissemination, and standardisation.

Administrative information and tools are introduced firstly in this document which are beneficial for achieving efficient and effective internal disseminations. It includes:

- MS TEAMs for basic cooperative work support.
- Details of project logo, template documents, file naming conventions, acknowledgement text and mailing list
- Tracker tool for publications and deliverables
- Gitlab repository for B5G-OPEN source code management

The strategy for external disseminations is then introduced. After a detailed description of the project website, the project dissemination plan for each period has been presented. It covers activities across a variety of platforms and channels such as industry conferences, scientific publications, social media platforms, and organisation of workshops.

To evaluate and maximize the impact from B5G-OPEN dissemination activities, the numeric objectives are proposed and presented. In addition, the planned educational activities are described as well as the planned contribution to 5G-PPP such as whitepapers, working groups, and workshops.

Within the first year, B5G-OPEN has been active in these pre-mentioned dissemination activities. The number of publications has been 50 contributions to industry conference and 17 to scientific journals, which is significantly higher than the objective of 10 and 5 respectively for the first year. Moreover, constant effort has been made for updating the project website and the content in social medias such as LinkedIn, Twitter and the YouTube project channel.

Overall, excellent progress has been made towards WP6 tasks and objectives on dissemination and standardisation. We are confident to keep such active activities in the rest of project periods.

6 APPENDICES A COMPREHENSIVE LIST OF YEAR 1 DISSEMINATION ACTIVITY LIST

Publication and Dissemination Activiti