



Horizon 2020 TWEETHER

Travelling wave tube based w-band wireless networks with high data rate distribution, spectrum & energy efficiency

Project no: 644678

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WP7.

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|---|---|---|
| Dissemination level | | |
| PU | Public | X |
| PP | Restricted to other programme participants (including Commission Services) | |
| RE | Restricted to a group specified by the consortium (including the Commission Services) | |
| CO | Confidential, only for members of the consortium (including the Commission Services) | |

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EXECUTIVE SUMMARY

The Europe 2020 strategy for a smart, sustainable and inclusive economy underlines the central role of knowledge and innovation in generating growth. For that reason, the European Union (EU) strives to improve access to scientific information and to boost the benefits of public investment in the research funded under the EU Framework Programme for Research and Innovation Horizon 2020 (2014-2020).

According to this strategy, in Horizon 2020 a limited pilot action on open access to research data has been implemented so that participating projects will be required to develop a Data Management Plan (DMP), in which they will specify what data will be open.

This deliverable provides the second version of the DMP elaborated by the TWEETHER project. The purpose of this report is to provide an update of the previous DMP (submitted in M06) with a review of the data sets that will be collected, processed or generated inside the project and with more information about the mechanisms used to share or make the publications and the data open.

Following the EC requirements with respect to the Pilot on Open Research Data, an updated version of the present document will be submitted at the end of the project.

1. INTRODUCTION

In December 2013, the European Commission announced their commitment to open data through the Pilot on Open Research Data, as part of the Horizon 2020 Research and Innovation Programme. The Pilot's aim is to "improve and maximise access to and re-use of research data generated by projects for the benefit of society and the economy".

In the frame of this Pilot on Open Research Data, results of publicly-funded research should be disseminated more broadly and faster, for the benefit of researchers, innovative industry and citizens.

On one hand, Open Access allows not only accelerating discovery process and ease those research results to reach the market (thus meaning a return of public investment), but also avoids a duplication of research efforts thus leading to a better use of public resources and a higher throughput. On the other hand, this Open Access policy is also beneficial for the researchers themselves. Making the research publicly available increases the visibility of the performed research, what is translated into a significantly higher number of citations¹ as well as an increase in the collaboration potential with other institutions in new projects, among others. Additionally, Open Access offers small and medium-sized enterprises (SMEs) access to the latest research for utilisation.

Under H2020, each beneficiary must ensure open access to all peer-reviewed scientific publications relating to its results. These open access requirements are based on a balanced support to both 'Green open access' (immediate or delayed open access that is provided through self-archiving) and 'Gold open access' (immediate open access that is provided by a publisher).

Apart from open access to publications, projects must also aim to deposit the research data needed to validate the results presented in the deposited scientific publications, known as "underlying data". In order to effectively supply this data, projects need to consider at an early stage how they are going to manage and share the data they create or generate.

During the first months of the project, TWEETHER elaborated the first version of the Data Management Plan (DMP), which described how the scientific publications and research data generated during the project was going to be stored and made public. In particular, this DMP addressed the following issues:

- What data will be collected / generated in the course of the project?
- What data will be exploited? What data will be shared/made open?
- What standards will be used / how will metadata be generated?
- How will data be curated / preserved including after project completion

Since the DMP is expected to mature during the project, this deliverable provides an updated version of the previous DMP with a review of the data sets that will be collected, processed or generated inside the project and with more information about the mechanisms used to share or make the publications and the data open.

¹ "There is evidence that studies that make their data available do indeed receive more citations than similar studies that do not." Piwowar H. and Vision T.J 2013 "Data reuse and the open data citation advantage" <https://peerj.com/preprints/1.pdf>

Namely, the main updates of this deliverable are:

- Inclusion of Sections 4.1
- Inclusion of Section 5.1
- Description of the new data set related to the measurements on the W-band chipsets presented in Section 8 (Data set reference: DS_CHIPSET_SP).

2. TWEETHER PROJECT

The TWEETHER project will provide high capacity everywhere by the realisation of a W-band wireless system with a capacity and coverage of 10Gbps/km² for the backhaul and the access markets, considered by operators a key investment opportunity. Such a system, combined with the development of beyond state-of-the-art affordable millimetre wave devices, will permit to overcome the economical obstacle that causes the digital divide and will pave the way towards the full deployment of small cells.

This system merges for the first time novel approaches in vacuum electron devices, monolithic millimetre wave integrated circuits and networking paradigms to implement a novel transmitter to foster the future wireless communication networks.

In particular, the TWEETHER project is developing a novel, compact, low cost and high yield Traveling Wave Tube (TWT) power amplifier with 40W output power. This TWT will be the only device capable to provide wideband operation and enough output power to distribute the millimetre wave frequency signal to a useful distance.

On the other hand, advanced and high performance W-band transceiver chipset, enabling the low power operation of the system, is currently being fabricated. More concretely, this chipset includes various GaAs-based monolithic microwave integrated circuits (MMICs) comprising elements such as power amplifiers, down- and up-converters and 8x frequency multiplier.

These novel W-band elements will be integrated by using advanced micro-electronics and micro-mechanics to achieve compact front end modules, which will be assembled and packaged with interfaces and antennas for a field test to be deployed at the campus of the *Universitat Politècnica de València* to prove the breakthrough of the TWEETHER system in the millimetre wave wireless network field.

Therefore, TWEETHER addresses a highly innovative approach, being its more relevant audience the scientific community working in millimeter wave technology and wireless systems. In addition, due to the strong impact of the system, other expected audience will be the industrial community, standardization bodies working on the W-band and on definition of Multimedia Wireless Systems (MWS), and potential users such as telecom operators. In this way, defining an appropriate open data strategy will help increase the visibility of the performed research inside the scientific community and the industrial ecosystem, on one hand, and will ensure proper management of the intellectual property, on the other hand.

3. CONSIDERATIONS FOR PUBLIC INFORMATION

The H2020's open access policy pursues that the information generated by the projects participating in that programme is made publicly available. However, as stated in EC guidelines on Data Management in H2020², “As an exception, the beneficiaries do not have to ensure open access to specific parts of their research data if the achievement of the action's main objective, as described in Annex I, would be jeopardised by making those specific parts of the research data openly accessible. In this case, the data management plan must contain the reasons for not giving access.”

In agreement with this, the TWEETHER consortium will decide what information is made public according to aspects as potential conflicts against commercialization, IPR protection of the knowledge generated (by patents or other forms of protection), meaning a risk for obtaining the project objectives/outcomes, etc.

The TWEETHER project is pioneering research that is of key importance to the electronic and telecommunication industry. Effective exploitation of the research results depends on the proper management of intellectual property. Therefore, the TWEETHER consortium will follow the following strategy (Figure 1): if the research findings result in a ground-breaking innovation, the members of the consortium will consider two forms of protection: to withhold the data for internal use or to apply for a patent in order to commercially exploit the invention and have in return financial gain. In latter case, publications will be therefore delayed until the patent filing. On the contrary, if the technology developments are not going to be withheld or patented, the results will be published for knowledge sharing purposes.

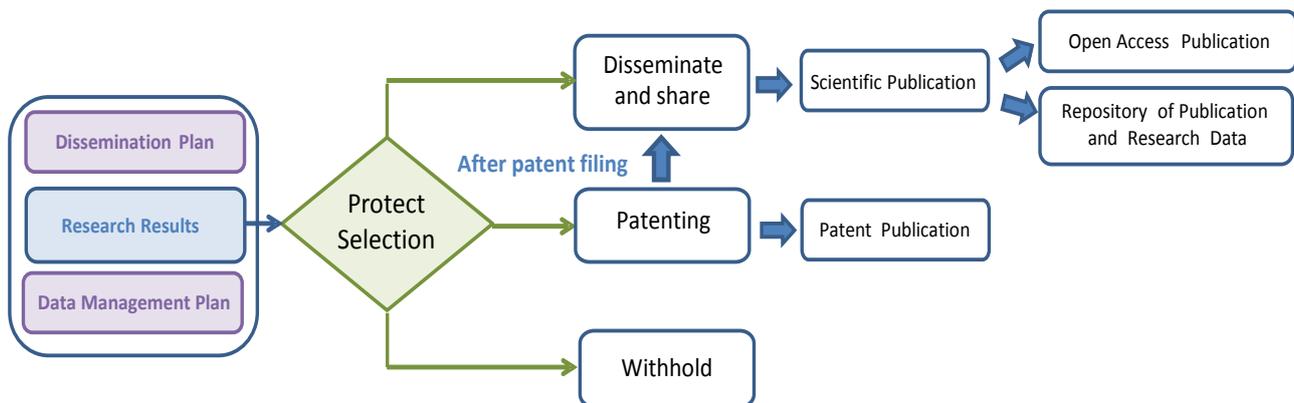


Figure 1. Process for determining which information is to be made public (from EC's document "Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020 – v1.0 – 11 December 2013")

4. OPEN ACCESS TO PUBLICATIONS

The first aspect to be considered in the DMP is related to the open access (OA) to the publications generated within the TWEETHER project, meaning that any peer-reviewed scientific publication made within the context of the project will be available online to any user at no charge. This aspect is mandatory for new projects in the Horizon 2020 programme (article 29.2 of the Model Grant Agreement).

² EC document: "Guidelines on Data Management in Horizon 2020" – versión 1.0 – 11 December, 2013

The two ways considered by the EC to comply with this requirement are:

- Self-archiving / ‘green’ OA: In this option, the beneficiaries deposit the final peer-reviewed manuscript in a repository of their choice. In this case, they must ensure open access to the publication within a maximum of six months (twelve months for publications in the social sciences and humanities).
- Open access publishing / ‘gold’ OA: In this option, researchers publish their results in open access journals, or in journals that sell subscriptions and also offer the possibility of making individual articles openly accessible via the payment of author processing charges (APCs) (hybrid journals). Again, open access via the chosen repository must be ensured upon publication.

Publications arising from the TWEETHER project will be deposited in a repository (‘green’ OA) and, whenever possible, the option ‘gold’ OA will be used in order to provide the widest dissemination of the published results.

With respect to the ‘green’ OA option it should be mentioned that most publishers allow to deposit a copy of the article in a repository, sometimes with a period of restricted access (embargo)³.

In Horizon 2020, the embargo period imposed by the publisher must be shorter than 6 months (or 12 months for social sciences and humanities). This embargo period will be therefore taken into account by the TWEETHER consortium to choose the open access modality for the fulfilment of the open access obligations established by the EC.

Additionally, according to the EC recommendation, whenever possible the TWEETHER consortium will retain the ownership of the copyright for their work through the use of a ‘License to Publish’, which is a publishing agreement between author and publisher. With this agreement, authors can retain copyright and the right to deposit the article in an Open Access repository, while providing the publisher with the necessary rights to publish the article. Additionally, to ensure that others can be granted further rights for the use and reuse the work, the TWEETHER consortium may ask the publisher to release the work under a Creative Commons license, preferably CC-0 or CC-BY.

Besides these two facts (retaining the ownership of the publication and embargo period), the TWEETHER consortium will also consider the relevance of the journal where it is intended to publish, measured by means of the “impact factor” (IF). We expect that the work to be carried out in the TWEETHER project leads to results with a very high impact, which are desired to be published in high IF journals. Therefore, we will also consider this factor when selecting the journal to publish the TWEETHER project results.

Here we provide a list of the journals initially considered for the publications to be generated in the TWEETHER project with information about the open access policy of each journal.

| Publisher | Journal | Impact factor (2013) | Author charges (for OA) | Comments about open access |
|-----------------------------|------------------------------|-----------------------------|--------------------------------|--|
| Institute of Electrical and | IEEE Wireless Communications | 6.524 | \$1,750 | A paid open access option is available for this journal. |

³ <http://www.sherpa.ac.uk/romeo/>

Project Acronym: TWEETHER

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|------------------------------|--|--------------|----------|---|
| Electronics Engineers (IEEE) | IEEE Communications Magazine | 4.460 | | If funding rules apply, authors may post Author's post-print version in funder's designated repository. Publisher's version/PDF cannot be used. |
| | IEEE Journal on Terahertz Technology | 4.342 | | |
| | IEEE Electron Device Letters | 3.023 | | |
| | IEEE Transactions on Microwave Theory and Techniques | 2.943 | | |
| | IEEE Transactions on Electron Devices | 2.358 | | |
| | IEEE Transactions on Components, Packaging, and Manufacturing Technology | 1.236 | | |
| | IEEE Journal of the Electron Devices Society | Started 2013 | \$1,350 | |
| Springer | Journal of Infrared, Millimeter, and Terahertz Waves | 1.891 | 2,200€ | Springer's Open Choice eligible journals publish open access articles under the liberal Creative Commons Attribution 4.0 International (CC BY) license. If not, author's post-print can be posted on any open access repository after 12 months after publication (Publisher's version/PDF cannot be used) |
| AIP | Applied Physics Letters | 3.515 | \$ 2,200 | A paid open access option is available for this journal. If funding rules apply, publishers version/PDF may be used on author's personal website, institutional website or institutional repository |

From this list, we can see that the majority of the journals targeted by the TWEETHER project are IEEE journals, which allow an open access modality and the author's post-print version can be deposited in a repository. This is in line with the Horizon 2020 requirements.

All the publication will acknowledge the project funding. This acknowledgment must be included also in the metadata of the generated information, since it allows to maximise the discoverability of publications and to ensure the acknowledgment of EU funding. The terms to be included in the metadata are:

- "European Union (EU)" and "Horizon 2020"
- the name of the action, acronym and the grant number
- the publication date, length of embargo period if applicable, and a persistent identifier (e.g DOI, Handle)

Finally, in the Model Grant Agreement, "scientific publications" mean primarily journal articles. Whenever possible, TWEETHER will provide access to other types of scientific publications such as conference papers, presentations, public deliverables, etc.

4.1. Access to peer-reviewed scientific publication

An important objective of TWEETHER is the dissemination of its research results to the scientific community, targeting the scientific journals, conferences or workshops with the highest impact. Indeed, several peer-reviewed scientific papers have been presented so far in relevant international conferences. These publication are or will be available online, as required by the EC:

- C. Paoloni, R. Letizia, F. Napoli, Q. Ni, A. Rennie, F. André, K. Pham, F. Magne, I. Burciu, M. Rocchi, M. Marilier, R. Zimmerman, V. Krozer, A. Ramirez, R. Vilar, "Horizon 2020 TWEETHER project for W-band high data rate communications", 16th International Vacuum Electronics Conference (IVEC 2015), Beijing, China, April 2015.

Available through OpenAIRE and UPV's RiuNet repository:
<http://hdl.handle.net/10251/62240>

- C. Paoloni, R. Letizia, Q. Ni, F. André, I. Burciu, F. Magne, M. Rocchi, M. Marilier, R. Zimmerman, V. Krozer, A. Ramirez, R. Vilar, "Scenarios and Use Cases in Tweether: W-band for Internet Everywhere", 24th European Conference on Networks and Communications, Paris, France, June 2015.

Available through OpenAIRE and UPV's RiuNet repository:
<http://hdl.handle.net/10251/62274>

- C. Paoloni, R. Letizia, F. André, S. Kohler, F. Magne, M. Rocchi, M. Marilier, R. Zimmerman, V. Krozer, G. Ulisse, A. Ramirez, R. Vilar, "W-band TWTs for New Generation High Capacity Wireless Networks", 17th International Vacuum Electronics Conference (IVEC 2016), Monterey, US, April 2016.

The access to this publication will be available shortly through OpenAIRE.

- Claudio Paoloni, François Magne, Frédéric André, Viktor Krozer, Rosa Letizia, Marc Marilier, Antonio Ramirez, Marc Rocchi, Ruth Vilar, Ralph Zimmerman, "Millimeter Wave Wireless System based on Point to Multipoint Transmissions", 25th European Conference on Networks and Communications (EUCNC2016).

To be published. We will provide access upon publication.

- Claudio Paoloni, François Magne, Frédéric André, Viktor Krozer, Marc Marilier, Antonio Ramirez, Ruth Vilar, Ralph Zimmerman, “W-band point to multipoint system for small cells backhaul”, 25th European Conference on Networks and Communications (EUCNC2016).

To be published. We will provide access upon publication.

- C. Paoloni, F. André, V. Krozer, R. Zimmerman, S. Koeller, Q. T. Le, R. Letizia, A. Sabaawi, G. Ulisse, “A Traveling Wave Tube for 92 – 95 GHz band wireless applications”, 41st International Conference on Infrared, Millimeter and Terahertz Waves (IRMMW-THz 2016), Copenhagen, Denmark, 2016.

To be published. We will provide access upon publication.

Apart from the open access to the scientific papers detailed above, TWEETHER has provided access to other type of documents such as public deliverables and presentations given in scientific and industrial workshops through the project website and ZENODO repository.

In addition, a workshop on Millimetre-wave Technologies for High-Speed Broadband Wireless Networks was organized in the frame of TWEETHER. The presentations of this workshop are available on the project website for download.

5. RESEARCH DATA

The scientific and technical results of the TWEETHER project are expected to be of maximum interest for the scientific community. Through the duration of the project, once the relevant protections (e.g. IPR) are secured, the TWEETHER partners may disseminate (subject to their legitimate interests) the obtained results and knowledge to the relevant scientific communities through contributions in journals and international conferences in the field of wireless communications and millimetre-wave technology.

Apart from the open access to publication explained in the previous section, the Open Research Data Pilot also applies to two types of data⁴:

- The data, including associated metadata, needed to validate the results presented in scientific publications (underlying data);
- Other data, including associated metadata, as specified and within the deadlines laid down in a data management plan, to be developed by the project. In other words, beneficiaries will be able to choose which data, additionally to the data underlying publications, they make available in open access mode.

According to this requirement, the underlying data related to the scientific publications will be made publicly available (See Section 8). This will allow that other researchers can make use of that information to validate the results, thus being a starting point for their investigations, as expected by the EC through its open access policy. But, in order to be aligned with the protection policy and strategy described, the data sets will be analysed on a case by case basis before making them open with the objective to not jeopardize exploitation or commercialization purposes. As a result, the publication of research data will be mainly followed by those partners involved in the scientific

⁴ EC document: “Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020” – version 1.0 – 11 December, 2013

development of the project (i.e., academic and research partners), while those partners focused on the “development” of the technology will limit the publication of information due to strategic/organizational reasons (commercial exploitation).

In the first version of the DMP the project consortium provided an explanation of the different types of data sets to be generated in TWEETHER. Examples of these data are the specifications of the TWEETHER system and the services it supports, the datasheets and performances of the technological developments of the project, the field trial results with the KPIs (Key Performance Indicators) used to evaluate the system performances, among others.

As the nature and extent of these data sets can be evolved during the project, the objective of this deliverable is to review the data sets identified so far to determine if they should be modified/updated or if new data sets should be included. In particular, it has been included a data set related to the measurements on the W-band chipsets (see Section 8). The rest of the data sets are still relevant.

5.1. Access to research data

According to the requirement of providing access to the data needed to validate the results presented in the scientific publications (i.e., underlying data), some research results will be publicly available:

- Results of the W-band TWT gain and output power simulated by using MAGIC 3D Particle in Cell Simulators. These results were presented in the IVEC paper.
- The underlying data corresponding to the paper “Millimeter Wave Wireless System based on Point to Multipoint Transmissions” to be presented at the EUCNC 2016 will be made open upon publication.

6. METADATA

Metadata refers to “data about data”, i.e., it is the information that describes the data that is being published with sufficient context or instructions to be intelligible for other users. Metadata must allow a proper organization, search and access to the generated information and can be used to identify and locate the data via a web browser or web based catalogue.

Two types of metadata will be considered within the frame of the TWEETHER project: that corresponding to the project publications, and that corresponding to the published research data.

With respect to the metadata related to scientific publications, as described in Section 4, they include the title, the authors, publication date, funding institution (EU H2020), grant number, persistent identifier (e.g DOI, Handle), etc. Figure 2 shows an example of metadata used for the scientific paper presented at the EuCNC2015.

Files in this item



Name: EUCNC2015 - final.pdf
Size: 2.708Mb
Format: PDF
Description: Versión editorial

Request a copy of the document



Name: Vilar Mateo, R. - ...
Size: 389.1Kb
Format: PDF
Description: Versión del autor

Open/Preview

Item Metadata

| | |
|--------------------------------|--|
| Title: | Scenarios and Use Cases in Tweether: W-band for Internet Everywhere |
| Author: | Paolini, Claudio , Letizia, Rosa Ni , Qiang, André , Frédéric Burciu , Ioan Magne , François Rocchi , Marc Marillier , Marc Zimmerman , Ralph Krozer , Viktor Ramirez , Antonio Vilar Mateo , Ruth |
| UPV Unit: | Universitat Politècnica de València , Instituto Universitario de Tecnología Nanofotónica - Institut Universitari de Tecnologia Nanofotónica |
| Issued date: | 2015-06-29 |
| Abstract: | —Millimeter waves offer a promising solution to the data congestion that is fast overwhelming the actual network capacity. While the V- band (57-64GHz) and E-band (71-76GHz and 81-86 GHz) are widely targeted for Point ...[+] |
| Subjects: | Millimetre-wave Point to Multi-Point Wireless networks 5G Small Cells Travelling Wave Tube (TWT) Backhaul Capacity density |
| Copyrights: | Reserva de todos los derechos (NO CC) |
| ISSN: | 978-1-4673-7358-6 |
| Publisher: | Institute of Electrical and Electronics Engineers (IEEE) |
| Project ID: | info:eu-repo/grantAgreement/EC/H2020/644678 |
| Sponsorship: | European Union's Horizon 2020 - 644678. |
| xmlui.dri2xhtml.METS-1.0.type: | Capítulo de libro |

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- [OpenAIRE \(Open Access Infrastructure for Research in Europe\)](#) [355]
- [Artículos, conferencias, monografías](#) [7789]

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Figure 2. Metadata used for the scientific paper presented at the EuCNC2015

In the context of data management, metadata will form a subset of data documentation that will explain the purpose, origin, description, time reference, creator, access conditions and terms of use of a data collection.

The metadata that would best describe the data depends on the nature of the data. For research data generated in TWEETHER, it is difficult to establish a global criteria for all data, since the nature of the initially considered data sets will be different, so that the metadata will be based on a generalised metadata schema as the one used in ZENODO⁵, which includes elements such as:

- Title: free text
- Creator: Last name, first name
- Date
- Contributor: It can provide information referred to the EU funding and to the TWEETHER project itself; mainly, the terms "European Union (EU)" and "Horizon 2020", as well as the name of the action, acronym and the grant number

⁵ <http://invenio-software.org/wiki/Project/OpenAIREplus/DevelopmentRecordMarkup>

- Subject: Choice of keywords and classifications
- Description: Text explaining the content of the data set and other contextual information needed for the correct interpretation of the data.
- Format: Details of the file format
- Resource Type: data set, image, audio, etc.
- Identifier: DOI
- Access rights: closed access, embargoed access, restricted access, open access.

Additionally, a readme.txt file could be used as an established way of accounting for all the files and folders comprising the project and explaining how all the files that make up the data set relate to each other, what format they are in or whether particular files are intended to replace other files, etc.

Based on the comments presented above, Figure 3 shows an example of metadata used in ZENODO for the data uploaded to this platform.

The screenshot shows a Zenodo metadata page for a presentation. The title is "Tweether for Internet everywhere" by Paoloni, Claudio. The publication date is 01 October 2015. The DOI is 10.5281/zenodo.31702. The keywords are Millimetre-wave, Wireless networks, small cells, and Access. The collections include Communities > H2020 TWEETHER project, Presentations, and Open Access. The license is Creative Commons Attribution. The uploader is rutvima, who uploaded it on 01 October 2015. There is a "Preview" button at the bottom left of the main content area.

Figure 3. Metadata used in ZENODO for data uploaded to this platform

7. DATA SHARING, ARCHIVING AND PRESERVATION

A repository is the mechanism to be used by the project consortium to make the project results (i.e., publications and scientific data) publicly available and free of charge for any user. According to this, several options are considered/suggested by the EC in the frame of the Horizon 2020 programme to this aim:

- For depositing scientific publications:
 - Institutional repository of the research institutions (e.g., RiuNet at UPV)
 - Subject-based/thematic repository
 - Centralised repository (e.g., Zenodo repository set up by the OpenAIRE project)
- For depositing generated research data:
 - A research data repository which allows third parties to access, mine, exploit, reproduce and disseminate free of charge
 - Centralised repository (e.g., Zenodo repository set up by the OpenAIRE project)

The academic institutions participating in TWEETHER have available appropriate repositories which in fact are linked to OpenAIRE (<https://www.openaire.eu/participate/deposit/idrepos>):

- **Lancaster University - Lancaster E-Prints**

Type: Publication Repository

Contents: Journal articles, Conference and workshop papers, Theses and dissertations, Books, chapters and sections, Other special item types

Website URL: <http://eprints.lancs.ac.uk/>

Compatibility: OpenAIRE Basic (DRIVER OA)

OAI-PMH URL: <http://eprints.lancs.ac.uk/cgi/oai2>

- **Hochschulschriftenserver - Universität Frankfurt am Main**

Type: Publication Repository

Contents: Journal articles, Conference and workshop papers, Theses and dissertations, Unpublished reports and working papers

Website URL: <http://publikationen.ub.uni-frankfurt.de/>

Compatibility: OpenAIRE Basic (DRIVER OA)

OAI-PMH URL: <http://publikationen.ub.uni-frankfurt.de/oai>

- **Universitat Politècnica de Valencia (UPV) – RiuNet**

Type: Publication Repository

Contents: Journal articles, Conference and workshop papers, Theses and dissertations, Learning Objects, Multimedia and audio, visual materials, Other special item types

Website URL: <http://riunet.upv.es/>

Compatibility: OpenAIRE 2.0+ (DRIVER OA, EC funding)

OAI-PMH URL: <https://riunet.upv.es/oai/driver>, <https://riunet.upv.es/oai/openaire>

Note that all these repositories make use of the OAI-PMH protocol (Open Archives Initiative Protocol for Metadata Harvesting), what allows that the content can be properly found by means of the defined metadata.

These institutional repositories will be used to deposit the publications generated by the institutions detailed above. Indeed, as commented in Section 4.1, the scientific papers published so far are available in the RiuNet repository and in OpenAIRE through the following link: https://www.openaire.eu/search/project?projectId=corda_h2020::546a6950975d78f06a46bc53f2bfc9ef

Apart from these repositories, the TWEETHER project will also use the centralised repository ZENODO to ensure the maximum dissemination of the information generated in the project (research publications and data), as this repository is the one mainly recommended by the EC's OpenAIRE initiative in order to unite all the research results arising from EC funded projects.

Indeed, ZENODO⁶ is an easy-to-use and innovative service that enables researchers, EU projects and research institutions to share and showcase multidisciplinary research results (data and publications) that are not part of existing institutional or subject-based repositories. Namely, ZENODO enables users to:

- easily share the long tail of small data sets in a wide variety of formats, including text, spreadsheets, audio, video, and images across all fields of science
- display and curate research results, get credited by making the research results citable, and integrate them into existing reporting lines to funding agencies like the European Commission
- easily access and reuse shared research results
- define the different licenses and access levels that will be provided

Furthermore, ZENODO assigns a Digital Object Identifier (DOI) to all publicly available uploads, in order to make content easily and uniquely citable and this repository also makes use of the OAI-PMH protocol (Open Archives Initiative Protocol for Metadata Harvesting) to facilitate the content search through the use of defined metadata. This metadata follows the schema defined in INVENIO⁷ (a free software suite enabling to run an own digital library or document repository on the web) and is exported in several standard formats such as MARCXML, Dublin Core and DataCite Metadata Schema according to OpenAIRE Guidelines.

On the other hand, considering ZENODO as the repository, the short- and long-term storage of the research data will be secured since they are stored safely in same cloud infrastructure as research data from CERN's Large Hadron Collider. Furthermore, it uses digital preservation strategies to storage multiple online replicas and to back up the files (Data files and metadata are backed up on a nightly basis).

Therefore, this repository fulfils the main requirements imposed by the EC for data sharing, archiving and preservation of the data generated in TWEETHER. For this reason, a ZENODO community for TWEETHER documents has been created, and can be accessed through the following link: <https://zenodo.org/collection/user-tweether-project>

8. DESCRIPTION OF DATA SETS TO BE GENERATED OR COLLECTED

This section provides an explanation of the different types of data sets to be produced in TWEETHER, which has been identified at this stage of the project. As the nature and extent of these data sets can be evolved during the project, in this deliverable a new data set associated with the S-parameters of the W-band chipsets has been identified and included in this section together with the rest of the data sets described in the previous data management plan.

The descriptions of the different data sets, including their reference, file format, the level of access, and metadata and repository to be used (considerations described in Section 6 and 7), are given below.

⁶ <http://www.zenodo.org/>

⁷ <http://invenio-software.org/>

| | |
|-----------------------------------|---|
| Data set reference | DS_SP_1 |
| Data set name | TWT_SP_X |
| Data set description | This data set will comprise the measured or simulated S-parameter results for the TWT structure. It will mainly consist of small-signal calculations of the cold simulations or measurements of the TWT at the respective ports. |
| File format | Touchstone format |
| Standards and metadata | The metadata is based on ZENODO's metadata, including the title, creator, date, contributor, description, keywords, format, resource type, etc. (See Section 6) |
| Data sharing | This data set will be widely open and will be deposited in the ZENODO repository. To analyse this data CST Software or Magic Software are necessary. |
| Archiving and preservation | This data set will be archived and preserved in ZENODO (See Section 7) |

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|-----------------------------------|---|
| Data set reference | DS_PS_1 |
| Data set name | TWT_PS_X |
| Data set description | This data set will comprise results of the power levels at the relevant ports of the TWT structure. They will include the DC bias conditions together with the input and output power at all ports. The results will be either based on measured values or obtained from simulations. It will mainly consist of small-signal calculations of the hot simulations or measurements of the TWT at the respective ports. |
| File format | MDIF or XPA format |
| Standards and metadata | The metadata is based on ZENODO's metadata, including the title, creator, date, contributor, description, keywords, format, resource type, etc. (See Section 6) |
| Data sharing | This data set will be widely open and will be deposited in the ZENODO repository. To analyse this data CST Software or Magic Software are necessary. |
| Archiving and preservation | This data set will be archived and preserved in ZENODO (See Section 7) |

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| Data set reference | DS_CHIPSET_DS |
| Data set name | Semi-conductor Radio Chipset Datasheet |
| Data set description | This dataset contain the datasheet of the III-V semi conductor products used by the 2 radios of the TWEETHER project |
| File Format | File format is the PDF format |
| Standards and metadata | The metadata is based on ZENODO's metadata, including the title, creator, date, contributor, description, keywords, format, resource type, etc. (See Section 6) |
| Data sharing | This data set will be widely open and will be deposited in the |

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| | ZENODO repository. |
| Archiving and preservation | This data set will be archived and preserved in ZENODO (See Section 7). |

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|-----------------------------------|---|
| Data set reference | DS_CHIPSET_SP |
| Data set name | CHIPSET_SP_X |
| Data set description | This data set will comprise the measured or simulated S-parameter results for the OMMIC chipsets. |
| File format | Touchstone format |
| Standards and metadata | The metadata is based on ZENODO's metadata, including the title, creator, date, contributor, description, keywords, format, resource type, etc. (See Section 6) |
| Data sharing | This data set will be widely open and will be deposited in the ZENODO repository provided that this does not jeopardise future exploitation. |
| Archiving and preservation | Whenever possible, this data set will be archived and preserved in ZENODO (See Section 7). |

| | |
|-----------------------------------|--|
| Data set reference | DS_SYS_1 |
| Data set name | System datasheet |
| Data set description | System general architecture, network interfaces, system data sheet, sub-assemblies datasheets, range diagrams, photos of equipment. General information useful for potential users. This data set will be suitable for publications in scientific and industrial conferences. |
| File Format | PDF |
| Standards and metadata | The metadata is based on ZENODO's metadata, including the title, creator, date, contributor, description, keywords, format, resource type, etc. (See Section 6) |
| Data sharing | This data set will be widely open and will be deposited in the ZENODO repository. |
| Archiving and preservation | This data set will be archived and preserved in ZENODO (See Section 7). |

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|-------------------------------|---|
| Data set reference | DS_SYS_2 |
| Data set name | System Deployments |
| Data set description | System coverage capabilities. Deployment methods to optimize coverage, frequency re-use process. Scenario graph. General information useful for potential users. This data set will be suitable for publications in scientific and industrial conferences. |
| File format | PDF |
| Standards and metadata | The metadata is based on ZENODO's metadata, including the title, creator, date, contributor, description, keywords, format, resource type, etc. (See Section 6) |
| Data sharing | This data set will be widely open and will be deposited in the ZENODO repository. |

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| Archiving and preservation | This data set will be archived and preserved in ZENODO (See Section 7). |
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|-----------------------------------|---|
| Data set reference | DS_MM-A_1 |
| Data set name | W-band Millimetre Antennas |
| Data set description | Adaptation S parameters, bandwidth, radiating diagrams: co-polar & cross-polar. Antennas datasheet: graphs and tables. This data set will be suitable for publications in scientific and industrial conferences. |
| File format | PDF |
| Standards and metadata | The metadata is based on ZENODO's metadata, including the title, creator, date, contributor, description, keywords, format, resource type, etc. (See Section 6) |
| Data sharing | This data set will be widely open and will be deposited in the ZENODO repository. |
| Archiving and preservation | This data set will be archived and preserved in ZENODO (See Section 7). |

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|-----------------------------------|---|
| Data set reference | DS_FT_1 |
| Data set name | Field trial description |
| Data set description | This data set will comprise a description of the wireless network architecture including the hardware, interfaces and services that will be deployed at the UPV campus and used for the field trial. In addition, it will provide information about sites (number of sites and its location), the expected objectives to be achieved and the envisaged scenarios for the system. This information will be interesting for potential users such as telecom operators. |
| File Format | PDF |
| Standards and metadata | The metadata is based on ZENODO's metadata, including the title, creator, date, contributor, description, keywords, format, resource type, etc. (See Section 6) |
| Data sharing | This data set will be widely open (URL access) and a summary of these data will be deposited in the ZENODO repository. |
| Archiving and preservation | This data set will be archived and preserved in ZENODO (See Section 7). |

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|-----------------------------|--|
| Data set reference | DS_FT_2 |
| Data set name | Field trial long term KPI measurements |
| Data set description | This data set will comprise the results of the measurement campaign carried out to evaluate the performance of the field trial deployed at the UPV campus integrating the technology developed in TWEETHER. It will include data obtained from the Network Monitoring System (PRTG software or similar), which collects KPIs from the network elements. Some examples of KPIs are throughput, RSSI (received signal strength indicator) and dropped packets. Those data will be |

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| | publicly accessible through a URL. This information will be interesting for potential users such as telecom operators. |
| Standards and metadata | The metadata is based on ZENODO's metadata, including the title, creator, date, contributor, description, keywords, format, resource type, etc. (See Section 6) |
| Data sharing | This data set will be widely open (URL access) and a summary of these data will be deposited in the ZENODO repository. |
| Archiving and preservation | This data set will be archived and preserved in ZENODO (See Section 7). |

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|-----------------------------------|---|
| Data set reference | DS_FT_3 |
| Data set name | Field trial bandwidth tests |
| Data set description | This data set will comprise descriptive information of the bandwidth tests used to evaluate the network at specific times. Those tests will employ a traffic generator software allowing to send and receive traffic between hosts comprising the network and providing a measurement of the maximum available bandwidth and also latency and jitter values. It will mainly consist of a doc-type document with details related to the steps to be followed in this test and the results obtained as well as well as examples of the scripts (or its description) used to obtain those results. This information will be interesting for potential users such as telecom operators. |
| File format | Word or PDF |
| Standards and metadata | The metadata is based on ZENODO's metadata, including the title, creator, date, contributor, description, keywords, format, resource type, etc. (See Section 6) |
| Data sharing | This data set will be widely open and will be deposited in the ZENODO repository. To perform this test, Ipref tool (or similar) is required. |
| Archiving and preservation | This data set will be archived and preserved in ZENODO (See Section 7). |

Apart from the data sets specified that will be made open, other data generated in TWEETHER such as the circuit detailed specifications and realisation, and terminal integration should be kept confidential to avoid jeopardising future exploitation.