Horizon 2020 TWEETHER

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

Project no: 644678

Project acronym: **TWEETHER**

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

WP7.

Deliverable D7.3:

Data Management Plan (version 1)

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Project Co- funded by the European Commission within the Horizon 2020		
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 first version of the DMP elaborated by the TWEETHER project. The purpose of this report is to provide an analysis of the main elements of the data management policy that will be used with regard to all the data sets that will be generated by the project. In particular, the deliverable outlines how research data will be handled during TWEETHER and describes what data will be collected, processed or generated and following what methodology and standards, whether and how this data will be shared and/or made open, and how it will be curated and preserved.

Since the DMP is expected to mature during the project, more detailed versions of the DMP will be submitted as additional deliverables at later stages 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 citations[1] 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. This 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.

In this document, we will introduce the first version of the Data Management Plan (DMP) elaborated for the TWEETHER project. The DMP will describe how to select, structure, store and make public the information used or generated during the project, both considering scientific publications as well as generated research data. In particular, the DMP will include 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

This DMP will be updated during the project lifetime.

[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

2. TWEETHER PROJECT

The TWEETHER project will give the answer to the urgent needs to 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 will develop 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, will be fabricated. More concretely, this chipset will include various GaAs-based monolithic microwave integrated circuits (MMICs) comprising elements such as power amplifiers, down- and up-converters, 8-way multiplier, and SPDT switch.

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 Politecnica de Valencia* to prove to prove the breakthrough of the TWEETHER system in millimetre wave wireless network field.

Therefore, TWEETHER addresses a highly innovative approach so that the more relevant audience of the project will be 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.

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 H2020[2], "*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 line 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

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

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.

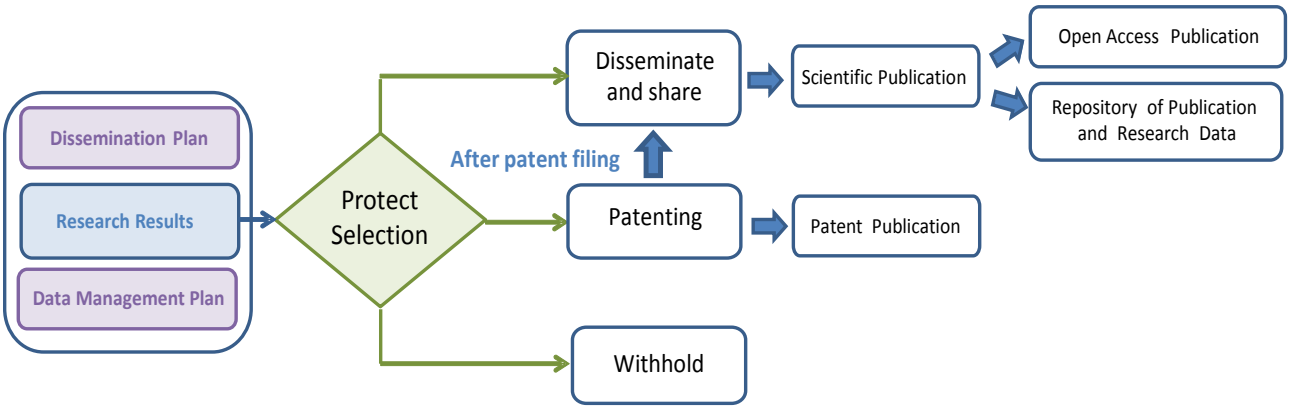

Figure 1. Process for determining which information is to be made public (from EC's document "Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020 – v1.0 – 11 December 2013")

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).

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 made public preferably through the option of 'gold' OA in order to provide the widest dissemination of the published results through the own webpages of the publishers. In other cases, the scientific publications will be deposited in a repository ('green' OA). 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

[3] http://www.sherpa.ac.uk/romeo/

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 Electronics Engineers (IEEE)	IEEE Wireless Communications	6.524	$1,750	A paid open access option is available for this journal. 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 Communications Magazine	4.460		
	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	It is a fully open-Access publication. Publisher's version/PDF can be archived on author's personal website, employer's website or funder's designated website. Creative Commons Attribution License is available if required by funding agency.
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 presentations, public deliverables, etc.

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 data[4]:

- 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.

These data will include a description of the procedures followed to obtain those results (e.g., software used for simulations, experimental setups, equipment used, etc.) as well as data generated following those procedures (experimental measurements results, spreadsheets, images, etc.).

In addition, other type of data generated during the project could be 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.

Since a huge amount of data is generated in a European project as TWEETHER, we will make a selection of relevant information, disregarding that not being relevant for the validation of the relevant published results. Moreover, we will analyse on a case by case basis all data generated during the project before making them open in order to be aligned with the exploitation and protection policy. As a result, the publication of research data will be mainly followed by those partners involved in the scientific development of the project (i.e., academic and research partners), while those partners focused on the "development" of the technology will limit this publication of information due to strategic/organizational reasons (commercial exploitation).

A more detailed description of the information expected to be generated in TWEETHER and whether and how it will be exploited or made publicly available is provided in Section 8.

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

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, which has already been described in Section 4, and that corresponding to the published research data.

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 ZENODO[5], 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
- 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.

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:

[5] http://invenio-software.org/wiki/Project/OpenAIREplus/DevelopmentRecordMarkup

- 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 depositories 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.

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, ZENODO[6] 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 INVENIO[7] (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.

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, more detailed descriptions will be provided in future versions of the DMP.

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)

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)

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 ZENODO repository.
Archiving and preservation	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).

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

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).

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).

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 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).

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.