5G for cooperative & connected automated MOBIlity on X-border corridors

D1.2

Quality Management Plan

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Control sheet

Version History			
Version	**Date**	**Modified by**	**Summary of changes**
V0.1 - V0.24	21.12.19 - 16.01.19	Sébastien Faye (LIST), Céline Décosse (LIST)	Draft versions
V0.8	17.01.19	Sébastien Faye (LIST), Céline Décosse (LIST)	Pre-final version
V0.9	28.01.19	Sébastien Faye (LIST)	Pre-final version (first revision)
V0.95	29.01.19	Sébastien Faye (LIST)	Pre-final version (second revision)
V1.0	30.01.19	Sébastien Faye (LIST)	Final version
V2.0	13.11.19	Sébastien Faye (LIST), Céline Décosse (LIST)	New version following the first technical review (July 2019): - The structure of the Quality assurance procedures section (Sec. 2.3) has been slightly revised. - The deliverable life cycle process/timeline has been slightly revised (Sec. 3.2.1). - A subsection about "Trials preparation and management" (Sec. 3.4) has been added. - New milestones (Sec. 3.6) have been added, focusing on the trials. - The risk management has been updated (Sec. 4.1). - - Minor updates: ProjectPlace replaced by MS Sharepoint; template and annexes updated.
V3.0	30.04.20	Céline Décosse (LIST) Sébastien Faye (LIST)	New version following the second technical review (December 2019): - The document, its structure and content have been completely simplified and made more specific to the project. - A preliminary set of quality criteria that are specific to the project's technical activities have been added.

			- Duplication of information with other deliverables (namely D1.1) is mostly avoided. However, there is still some information duplicated with D1.1, such as project contacts and roles that we consider essential for the project quality management. - The Peer Review Process Table and the Deliverable Life Cycle Process Table have been combined to simplify reading and remove inconsistencies. - The peer review process has been completely revised, adding the possibility to check which suggested changes have or have not been considered. - Revision and enhancement of the peer review section. - The risk management section has been deleted to avoid duplication with D1.1. - The deliverable section has been reorganized to be more user-friendly. Guidance on version numbering of deliverables is now provided. Responsibilities and timelines in the Deliverables Life Cycle Process Table have been updated - A new section has been added about the new Technical Management Experts Group. - The life cycle progress of deliverables in % has been simplified. - A new peer review report has been created.
V3.1			- Section about COVID-19 pandemic impact added (1.5) - Reorganisation of many sections - Rewriting of the Deliverable life cycle (2.4) with clarification of QM, DL and WPL responsibilities and addition of a summarised view and of tasks for resubmission of refused deliverables. - Gathering of deliverable quality criteria in a single point (2.5) - Clarification of the role of the Quality Management team.
V3.2			- Details added and updates following review from Coen Bresser. Addition of a section dedicated to reporting.

Peer review		
	Reviewer name	Date
Reviewer 1	Rita Bhandari (ERTICO)	25/01/2019
Reviewer 2	Kostas Trichias (WINGS)	25/01/2019
Reviewer 3	Francesco Ferrero (LIST)	28/01/2019
Reviewer 4	François Fischer (ERTICO)	30/01/2019, 25/03/2020
Reviewer 6	Coen Bresser (ERTICO)	02/02/2021

Legal disclaimer

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ABBREVIATIONS

Abbreviation	Definition
CCAM	Cooperative, Connected and Automated Mobility
DL	Deliverable Leader
EC	European Commission
KPI	Key Performance Indicator
PC	Project Coordinator
PMBoK[1]	Project Management Body of Knowledge
QA	Quality Assurance
QC	Quality Control process
QM	Quality Manager
QMP	Quality Management Plan
PMT	Project Management Team
SDO	Standards Developing Organisations
ToC	Table of Contents
WP	Work Package
WPL	Work Package Leader

[1] PMBoK® Guide – Sixth Edition (2017)

EXECUTIVE SUMMARY

The deliverable D1.2 – Quality Management Plan (QMP) aims at providing a single point of reference for the quality management processes implemented during the 5G-MOBIX project.

This deliverable complements D1.1 – Project Management Plan. D1.1 describes the overall project management and introduces elements that are essential to a proper understanding of the present document, for instance the detailed organisational structure of the project and risk management.

This QMP defines guidelines to ensure the overall project quality. It targets the achievement of high-quality project outcomes and primarily applies to deliverable management, reporting and dissemination activities. It also describes the project organisation, roles and responsibilities related to Quality Assurance (QA) and Quality Control (QC) activities. QA comprises managerial actions aiming at high-quality output whereas QC is used to verify the quality of the output.

QA activities and procedures include but are not limited to: *(a)* the definition of the roles and responsibilities of each partner in the consortium with regard to quality issues; *(b)* systematic use of 5G-MOBIX's communication elements, such as templates for deliverable peer-reviews. This part complements the outputs resulting from WP7 – Dissemination and Exploitation. QC activities and procedures include but are not limited to: *(a)* defining and applying a process for peer reviewers to guarantee that the project deliverables are of high-quality and meet scientific standards and project objectives; *(b)* clear deliverable evaluation criteria to monitor all phases of their development process.

The QMP is structured as follows. **The first chapter – Introduction** briefly presents 5G-MOBIX, describes the key concepts of quality management and outlines the QMP structure. **The second chapter – Quality Assurance Plan** presents the project's quality management principles in a comprehensive manner to help partner beneficiaries carry out their activities with a high standard of quality. **The third chapter – Quality Control Activities** provides a set of procedures for optimal monitoring of the project quality and production of deliverables. Finally, **the fifth chapter summarises** the main elements of the deliverable.

1. INTRODUCTION

1.1. Introduction to 5G-MOBIX

5G-MOBIX aims at executing Cooperative, Connected and Automated Mobility (CCAM) trials along x-border and urban corridors using 5G core technological innovations to qualify the 5G infrastructure and evaluate its benefits in the CCAM context as well as defining deployment scenarios and identifying and responding to standardisation and spectrum gaps. 5G-MOBIX's vision is to enable innovative, previously unfeasible, automated driving applications, both from a technical as well as from a business perspective.

The Project Consortium includes 49 beneficiaries and an additional nine international partners from Korea and China bringing the total partners involved to 58. This large Consortium shares responsibilities of tasks divided into eight Work Packages (WPs) across 10 EU countries as well as in Turkey, China and South Korea. This underlines the need for QM.

For a more details about the project, please refer to D1.1: *"Executive summary"* and *"5G-MOBIX concept and approach"*.

1.2. Introduction to Project Quality Management

This Quality Management Plan (QMP), mainly relies on the Project Management Body of Knowledge (PMBoK), a set of standard terminologies and guidelines for project management. The body of knowledge evolves over time. Its most recent version was released in 2017[2]. PMBoK results from work overseen by the Project Management Institute.

The PMBoK highlights the importance of quality planning, quality assurance and quality control as essential aspects of the project management plan. These quality management processes are defined in Table 1 – Project Quality Management Processes. All quality criteria that are specific to 5G-MOBIX are listed in the second chapter.

[2] PMBoK® Guide – Sixth Edition (2017)

Table 1 – Project Quality Management Processes (source: PMBoK Guide, 2017)

Quality management processes	What
Quality Planning ***When?*** **- Before the production process** **- When quality assurance activities find a quality issue involving project changes and an update of the project management plan.**	The QMP determines the quality requirements and how to measure and control them. It can be defined in a subsection of the project management plan or, for larger projects, a standalone document. **Outputs**: The QMP should contain at least: 1. Quality standards that apply to the project 2. Measurement criteria and frequency 3. Inspection criteria = Quality Control Sheets
Quality Assurance ***When?*** **During the production process, throughout the duration of the project.**	Quality Assurance is prevention of errors to reach quality. Performing quality assurance ensures that the processes are in place to produce the project deliverables at the applicable level of quality. Quality Assurance asks the following questions: 1. What are the applicable quality standards? 2. How is quality measured? 3. Who measures it? 4. What is measured? (number of units? types? processes?) 5. When is it measured? 6. What are the criteria for rejection? Quality Assurance creates and analyses the systems to measure and control quality, in order to create confidence that quality deliverables will be produced. **Outputs**: A quality system is in place.
Quality Control ***When?*** **After the production process.**	Quality Control is inspection for quality. **Quality control** measures the quality level of individual products and deliverables and accepts or rejects them based on the criteria developed by Quality Assurance. **Outputs**: Quality is monitored on project outputs. Measures are taken to reach the expected quality, which may result in a change to the quality management plan.

1.3. Purpose of the deliverable

The QMP is delivered as part of WP1 and serves as a guideline to enable a successful collaborative work towards achieving the project objectives with the highest quality. The results recorded in the document are established procedures for Quality Assurance and Quality Control, which are carried out through the following activities:

- Liaising with the Project Management Team (PMT) about the quality status of project deliverables;
- Defining 5G-MOBIX's quality procedures and providing guidelines for the production and peer review of project deliverables;
- Supporting the deliverable and work package leaders in producing deliverables of high quality;
- Supporting the coordination team with the risk management by monitoring quality risks.

1.4. Intended audience

The dissemination level of D1.2 is public (PU) but is meant primarily for *(a)* all members of the 5G-MOBIX project consortium, and *(b)* the European Commission (EC) services.

This document is intended to serve as an internal guideline and reference for all 5G-MOBIX beneficiaries, and the governance bodies such as the General Assembly, the Steering Committee, the PMT, and the Advisory Board.

1.5. Quality management activities modifications due to COVID-19 pandemic

As from 2020, a monthly update in a sheet on SharePoint is done and a bi-weekly assessment in PMT is performed to monitor the COVID-19 pandemic impacts on the project (quality). Besides, a COVID-19 section numbered 1.5 shall be added in any deliverable submitted after November 1st, 2020 (see paragraph 2.5.11). Quality Management is not affected further by the COVID-19 pandemic.

2. QUALITY ASSURANCE PLAN

2.1. Introduction

Quality Assurance, along with Quality Control, is a primary component of a project quality system and comprises a set of processes to ensure that project outputs meet the planned quality standards.

In 5G-MOBIX, the quality assurance plan:

- Defines roles and responsibilities of all parties involved in the quality processes;
- Establishes quality assurance procedures and reference documents to obtain project deliverables with a high-quality standard.
- Specifies tools and files that support Quality Management activities.

2.2. Quality assurance roles

The complete project organisation, including the different management structures and complete contact details, are described in deliverable D1.1. This section lists the governance bodies that have a direct responsibility in project quality management, as well as their roles, particularly with regard to the completion of tasks and submission of deliverables.

Operational bodies are detailed in D1.1. Quality assurance roles in 5G-MOBIX are distributed to participants according to their responsibilities. These roles are summarised in Table 2, where the **Project Management Team (PMT)** appears in orange (for project managers) and green.

Table 2 – Quality assurance roles in 5G-MOBIX

Role (Partner)	Responsibility regarding quality management
Project Coordinator (PC)	• He/she is overall responsible to ensure all is being delivered (with high quality)
Technical Coordinator (TC) WINGS	• Coordination of technical topics, management of technical scope and final decisions on technical aspects. • Collaborate with "Task T1.5 – Quality Management" to ensure deliverable quality, namely.
Work Package Leaders (WPLs)	• WPLs are responsible for monitoring the activities related to WP deliverables and other results (e.g. deployments, tests, demos), including quality aspects and respecting deadlines. WPLs report the progress to the PMT.

Role (Partner)	Responsibility regarding quality management
Corridor and Trial Site Leaders	• Ensure the harmonization of time plans, test scenarios, data management and the continual information about evaluation methods and impact assessment. These measures contribute to the project quality.
Task Leaders	• Coordinate quality control of the activities related to their task.
Deliverable Leaders (DLs)	• Coordinate quality control of their deliverables. • Are responsible for the execution of the activities related to a deliverable. They must liaise with task participants and communicate efficiently and regularly.
Deliverable reviewers	• Review deliverables according to a set of quality criteria.
Innovation Manager (VICOMTECH)	• Ensure that the project coordination develops favourable conditions for innovation and takes necessary actions to ensure that the innovations are effectively exploited after the end of 5G-MOBIX. Quality criteria are listed in Chapter 2.
Data Manager (AKKA)	• Raise potential issues and proposes solutions for dealing adequately with data privacy and data protection regulations. Quality criteria are listed in Chapter 2.
Quality and Risk Manager (LIST)	• Quality control and overall risk and deadlines management[3]. • Lead the Quality Management task (T1.5). • Act in support to the PMT (in particular WPLs) for implementing the QMP and management of quality processes. • Provide a quality review of each deliverable, plus a final check before sending deliverables to the EC.
Communication Manager (ERTICO)	• Ensure that the project is well coordinated for achieving excellent outreach with public events, scientific publications and presentations.

2.3. Quality criteria in 5G-MOBIX

The specifics of the 5G-MOBIX project are:

- The effect of a **large amount of partners** is that the total amount of effort is difficult to oversee and that it is more likely there are white/black spots between the combined partner scopes.
- The effect of a **large amount of languages/cultures** is that communication becomes more difficult. Due to differences in accents, behaviour, etc. it may happen that black spots and misunderstandings appear.

[3] Risk Management has historically been part of D1.1. To reduce the amount of edits in this document, keep the structure, purpose and name, Risk Management remains being described in D1.1.

- The effect of a **large amount of different technologies/solutions** is that maintaining an overview of the total set, interrelations and dependencies becomes difficult.
- The effect of **cross-site interdependencies** is that maintaining an overview of the total set, interrelations and dependencies becomes difficult.
- The effect of **the COVID-19 pandemic** on the project activities and tasks from March 2020 is that most of partners had to adapt themselves to teleworking, or even part-time working for some of them, and also it has an impact on the access to trial sites (low access) and might have an impact on the quality in the transfer developments across sites as for instance from TC to CBC.

The main aspects of above project specific quality drivers indicate a need for overviews, clear communication and task follow up. To address these aspects **quality measurements** are added for each task of each WP, and will be measured each 3 months. For each task, the task leader, and WP leader have to respond to the following questions:

- Global quality evaluation from Task leader / WP leader: Number between 1 and 4 (1 being bad, 4 being excellent); Comments.
- Communication evaluation from Task leader / WP leader: Number between 1 and 4 (1 being bad, 4 being excellent); Comments.
- Task follow up (completion due time / validity of estimated due date): Yes/No; Comments;
- WP/Task response to initial requirements objectives: Yes/No; Comments;
- COVID-19 pandemic impact evaluation on Task / WP: Number between 1 and 4 (1 being no impact, 4 being a huge impact); Comments and solutions envisaged.

Next to the specific attention points above, a list of more generic quality criteria is given in table 3 below. Here a list of quality criteria is provided that are considered in 5G-MOBIX and target values to ensure the overall quality of the project's outcomes, i.e. the conditions that need to be met to ensure quality. It covers general aspects of quality management, such as meeting deadlines or achieving deliverables, but also project-specific activities such as those related to trial sites.

Verification means are associated to each quality criteria. They are:

- **Success indicators,** that are measurable states that allow an assessment of criteria achievement,
- **Verifiers, that are** demonstrations that the required state is achieved.

They are managed in each WP under the responsibility of the WP leader. Table 3 defines criteria for ensuring quality. Target values should be defined for each verification means that will be actually used.

Table 3 – Criteria for ensuring quality in 5G-MOBIX

Category	WPs	Criteria	Verification means
Governance	WP1	Timeline: respect of deadline for submitting the deliverable to the European Commission	• Gantt chart and quality control.
		Regular monitoring of risk management	• Checked at least 4 times a year during a dedicated risk session in a Project Management Team meeting. • Monitoring of the top 10 risks in each Project Management Team meeting and WP meetings. • Management of the top 5 risks in each Project Management Team meeting and WP meetings.
		Status monitoring	• Dedicated WP meetings. • Bi-weekly PMT meetings, based on 40 working weeks. • General Assemblies at least twice a year.
Deployment, Roll-out & Integration	WP3	Development activities finished on time	• Development activities progress is managed for each activity by Task leaders with ClickUp. Tool produces alarms upon overdue tasks.
		Deployment and roll-out of equipment and infrastructure are on time	• Progress monitoring of individual roll-out activities by Task leaders via the ClickUp tool. Tool produces alarms upon overdue tasks.
		TS-CBC integration activities	• Specific tasks created in ClickUp. Progress monitored with the tool by the Task leaders. • Special task group created within the Technical Management Team. Monthly updates on status.
		Development, roll-out and integration activities alignment and scheduling.	• 5-phase plan defined in D3.1 with the agreement of all WP3 task leaders. Bi-weekly status monitoring at the T3.1 telco.
Trials	WP4	Definition of the trial methodology and preparation of the trials	• Biweekly calls and telcos are organised to check the progress and propose action plans to be undertaken until the next call. • A detailed calendar is setup at the WP4 level, and for each TS/CBCs. Preparation of a monitoring checklist to be later filled in by each TS and CBC. • A trial plan is set up by each TS and CBC for each scenario to be tested during the trial phase, with details on the scenarios, type of test, hypotheses, results obtained, data collected, etc. The progress of the Task Leaders' work and the deadlines is monitored with ClickUp.

		Execution of early trials and full trial phase	• Preparation of progress reports to be filled in twice (one during the early trials and one during the full trials). • Regular telcos are organised to monitor the progress of the trialling phase. • Workshops and experts' meetings address difficulties that may appear during the next phases.
		Coordination and transfer of developments	• Overview on what 5G technology is tested where (TS/CBC) and when. • Overview on what use-case is tested where (TS/CBC) and when. • Set minimum values: each UC should be tested in TS and in CBC, provided it is possible. If it is not possible a suitable explanation should be given and the evaluation should give learnings for the CBC's as well.
Technical evaluation data	WP5	Ensure that data are consistent before considering them for the KPI calculation.	• Total amount of valid data to perform the Technical Evaluation. This will be monitored by the quality check taskforce dedicated to WP5. NB: at the moment, there is no monitoring since we are yet to start generating measurement data. Once we start to have the data, Quality Check tools will be used to check on the data; these tools will generate quality reports when run, which will take place when the data is to be uploaded to the Central Test Server (CTS). This holds for the initial entry.
		Ensure that KPI values are consistent, accurately derived from measurement data and correctly associated to test case parameters, before considering them for reaching conclusions.	• This will be monitored by the quality check taskforce dedicated to WP5. This will be mostly manual, i.e. no automated procedure.
Recommendation and guidance for deployments	WP6	Regular monitoring of 5G for CCAM State of the Art	• Number of projects reviewed. • Number of challenges identified. • Number of technical innovations identified. These values are monitored in T6.1 & D6.1/D6.5.
		Regular monitoring of stakeholder needs	• Number of stakeholders reached. • Number of questionnaires sent. These are monitored in T6.4 & D6.4/D6.8.
		Potential for first market replication	• Number of business models proposed. • Coverage of value chain (# of stakeholders per study). • Number of gaps/barriers identified. These values are monitored in T6.2 & D6.2/D6.6.
		Potential for contribution to SDOs and other industry groups	• Number of contributions to SDOs. • Number of standards reviewed.

			• Number of gaps/barriers identified. • Number of technical innovations identified. • Number of SDO meetings attended. These values are monitored in T6.3 & D6.3/D6.7.
		Monitoring of spectrum allocation	• Number of countries where spectrum auctions are monitored. These values are monitored in T6.3 & D6.3/D6.7.
		Monitoring of regulatory frameworks	• Number of regulatory frameworks reviewed. • Number of gaps/barriers identified. These values are monitored in T6.4 & D6.4/D6.8.
Dissemination	WP7	Scientific quality	• Impact factor for journal publications • CORE rank for conference papers. • Prize-awarded stands at conferences and trade fairs. • Webinars: attendance and performance statistics (attendance and attentiveness rate, number of questions received). • Project workshops & stakeholder events (including demonstrations at pilot sites): number as well as types of stakeholders attending. • Number of peer-reviewed journal publications.
		Communication quality	• Number of news articles, posts, profiles or other information released through communication channels. (5G-Mobix website - Wordpress) • Website traffic: overall number of unique visitors to the 5G MOBIX website; traffic sources – creation of loyal visitors, direct traffic to the website; high bounce rate – length of stay on website. (Google analytics) • Number of followers on social media such as Twitter and Linked in use as a social forum. (Linkedin and Twitter insights) • e-newsletter: number of subscribers, opening rate. (Mailchimp) • Number of views for videos. YouTube insights and google analytics (if the content is included in the website) • Number of press mentions (following a communication of the project, e.g. press release, pilot site event) through a monitoring service. Meltwater platform (https://www.meltwater.com/en) These elements are usually reported in deliverables and periodic reports. It is also shared during periodic calls to assess the project's situation.

2.4. Deliverable life cycle

Deliverables are documents that are formally submitted to the EC. Deliverables should be edited only locally (not on Sharepoint) with MS Word, since the online SharePoint editor might create issues with the file and does not incorporate all the functionalities of the template.

Table 4 summarises Table 5, that details information for all actors and all deadlines before the date of the submission to the EC by 5G-MOBIX PC.

Table 4 - Deliverable life cycle summarized

	DL	WPL	QM	Peer Reviewers	PC
-6 months	- Set up document	- Check deadlines, scope, consistency	- Check awareness of DL and WPL about deadlines and roles		
-5 months	- Write table of content and share work between authors				
-3 months		- Select reviewers and inform them	- Check reviewers are informed about their roles and deadlines		
-1 month	- Consolidate deliverable with contributors' parts - Launch peer review and quality review		- Start Quality review	- Start peer review	
-20 days	- End of peer review - Manage integration of peer reviewers and quality check outputs		- End of Quality review	- End of peer review: upload review in the sharepoint (deliverable and peer review doc)	
-15 days	- Final check the deliverable for content and quality	- Final check deliverable	- Final check quality		
-2 working days			- Generate pdf, send to PC team		- Submit deliverable to the EC

Table 5 - Deliverable life cycle detailed

Owner		Actions
		6 months before deadline (date of delivery for submission on the EC)
1	DL	**Set up the document** with the deliverable template, then fill-in: • Deliverable audience. • Deliverable purpose.

		Inform the WPL that document has been set-up. Copy QM. A working space is available on Sharepoint in the Deliverables & Working documents /Drafts versions / Dx.x folder[4].
2	WPL	• Ensure that deadlines are met. • Ensure that deliverables have the appropriate scope and manages consistency between deliverables. • Inform the QM about deliverable status.
3	QM	• Check that the DL and the WPL are aware of deadlines and roles (WPL, DL, QM, Reviewers, Contributors)[5]. • Update the deliverable register based on information sent by the WPL.
		5 months before deadline

4	DL	**Write table of content and share work between authors.**
		• With all task participants:
		  ◦ Agree on Table of Content.
		  ◦ Share drafting responsibilities between authors at section level.
		
		• In the deliverable, fill-in:
		  ◦ An initial Table of Content – up to Level 3.
		  ◦ A first version of executive summary.
		  ◦ The deliverable type (see
		  ◦ Table 9).
		  ◦ The deliverable dissemination level (see Table 7).
		
		• Inform the WPL of the document status. **Copy the QM.**
		
		Writing process can start.
		• Ensure consistency across contributions
		• Monitor progress.
		• Liaise with WPL.
		
		Ensure that the deliverable meets its goal, is as short as possible, focuses on technical results and learning.

[4] Please use this folder rather than the Workplan / WPx / TaskX folder.
[5] A reminder conference call about quality management may be organised for persons implicated in writing deliverables, and for reviewers. The slides will be made available for everyone.

5	QM	Update the quality deliverable register based on information sent by the DL.
		3 months before deadline
6	WPL	**Select peer reviewers and inform them.** • Select at least two peer reviewers, with the assistance of the DL. This activity is described in the "Selecting peer reviewers" section, page 32. The Task Manager and Quality Manager can help if needed. • Notify (email) peer reviewers about their assignment with an indicative date to start the review and a deadline date to end the review (see 3.2.2Template email to launch a peer review). **Copy DL and QM.** Remind DL that she/he will manage the peer review process.
7	QM	• Check that reviewers are informed of their roles and of the deadlines. • Update the deliverable register file on Sharepoint with peer reviewers' names.
		1 month before deadline
8	DL	**Consolidate deliverable with contributors' parts.** • Merge input from all authors and perform final editing of the deliverable draft. • Ensure that the deliverable complies to the characteristics described in paragraph "2.5 Quality criteria for deliverables", including the peer review form criteria (paragraph 2.5.13). • If it is not yet there, upload the deliverable to be reviewed on Sharepoint in the Deliverables & Working documents /Drafts versions / Dx.x folder. **Launch peer review. Launch quality review.** Copy WPL and QM. Please use the "Template email to launch a peer-review" section, page 33.
9	QM	**Start quality review** Ensure that the deliverable complies to the characteristics described in paragraph "2.5 Quality criteria for deliverables". **Update the** peer-review status and the deliverable advancement status (80%) in the **deliverable register** on Sharepoint.
10	Peer-reviewers (supervised by the DL)	**Start peer review.** Ensure that the deliverable complies to the characteristics mentioned in the peer review form 2.5.13.

		20 days before deadline
11	QM	**End of quality review.** • Upload review in the SharePoint Deliverable & Working documents / Draft version folder / Dx.x / Reviews folder.
12	DL	**End of peer review.** **Ensure that each peer reviewer:** • Uploads the review in the SharePoint Deliverable & Working documents/ Draft version folder/ Dx.x /Reviews folder. • Notifies the DL and the QM that the review is available. **Fill-in the deliverable Control Sheet table** with peer-reviewers' names and organisations (page 2 of the deliverable). **Manage integration of peer reviewers' outputs by contributors.** • See 3.2.4 For DL and WPLs: how to take into account peer reviewers' comments.
		15 days before deadline
13	DL	**End of integration of peer reviewers' outputs.** • Upload the deliverable in MS Word format in the SharePoint Deliverable & Working documents/ Draft version folder/ Dx.x, along with a commented version of the deliverable to justify the rejection of important modifications asked by reviewers or the QM (if applicable). **Final check the deliverable for content and quality** • Check that the deliverable meets its goal, is as short as possible, focuses on technical results and learning (as in step 4). • As in step 8, ensure that the deliverable complies to the characteristics described in paragraph "2.5 Quality criteria for deliverables", including the peer review form criteria(2.5.13).
14	WPL	**Final check the deliverable**. • Manage last-minute changes with the assistance of the QM and the DL. • Checks that the deliverable has the appropriate scope and manage consistency between deliverables (as seen in step 2).
15	QM	**Final quality check the deliverable for quality.** • Contact the DL or the WPL for modifications; contact the PC in case of problem.

		2 working days before deadline
16	QM	Final check is over. • Generate a pdf version and store it in the Final version folder on SharePoint together with the MS Word version. • Send an email with the link to the containing folder in SharePoint to the PC team (ERTICO: Coen Bresser (Project Coordinator), Rita BHANDARI and Carmela CANONICO). Copy the WPL and the DL.
17	PC	• **Submit the deliverable to the EC,** via the EC portal (unless printed copies are requested).
		IN CASE OF REJECTION **~ 6 weeks before resubmission**
18	DL + WP	**Manage integration of EC comments.** Involve contributors.
		~ 2 weeks before resubmission
19	Peer-reviewers	It has to be decided between the DL and the QM if an additional review is needed or not for the resubmission. Generally, there won't be a additional peer-review for resubmission, it could be if there are a lot of changes to be done for the resubmission.
20	QM	Perform quality review: comment the MS Word deliverable file and fill in the Quality Review Form.
21	PC	• Check deliverable • Plan and have a meeting with the PO (if the PO encourages it for this deliverable).
22	DL + WP	**Manage integration of PO inputs.** Involve contributors.
23	QM	• Perform last quality check. • Generate a pdf version of the deliverable, store it on Sharepoint and send the link to the containing folder to the PC team (as in step 16) by e-mail Mention "please upload Dx.0" in this e-mail.
		Resubmission time
24	PC	**Submit the deliverable to the EC,** via the EC portal (as in step 17).

2.5. Quality criteria for deliverables

2.5.1. Overall quality

Please ensure content quality:

- Consistency with project scope. The deliverable starts with describing from what's in it for 5G.
- Consistency with the expected impact of the task with which the deliverable is associated.
- Assurance that all results and learnings of all associated partners are in the deliverable.
- Coherent structure.
- No redundancies with other deliverables.
- Fluff review to have "no fluff, just stuff": avoid writing lengthy deliverables without a substantial contribution to the project.

2.5.2. Quality of text

- Proofread and check language.
- Avoid copy/paste and plagiarism.
- Use dynamic cross-referencing of section numbers.

2.5.3. Apply MS words template

Please use the deliverable template available on SharePoint and pay a particular attention to the following points:

- Cover page,
- Numbering,
- Header and footer,
- Bullet points style,
- Executive summary without bullet points,
- Tables format, captions, clarity,
- Figures caption, figures readability,
- Title styles.

Formatting issues or template-related issues of any kind are the responsibility of the deliverable leader and must be managed with the communication manager.

2.5.4. Warning about headers and footers

Headers and footers may be tricky to manage in the deliverable template (see 2.3). It is advisable not to use the "Different Odd & Even Pages" option, and to use the "Different first page" option for differentiating the cover page, which has special headers and footers (i.e., EC acknowledgement footer and empty cover page header). Headers and footers should not be configured with the "Link to previous" option.

2.5.5. Naming convention and version numbering

Deliverables should be named using the following structure: "5G-MOBIX - DN.N - Name - vX.Y.docx".

Version numbering: The (first) version submitted to EC by the PC is V1.0. When a deliverable has been rejected and resubmitted, the subsequent submitted versions should be numbered as V2.0; V3.0, etc. The "y" in Vx.y may be used internally only to number draft versions.

A version should be Vx.0 only when it is submitted to the EC, before that the number should be V(x-1).y. It is changed to Vx.0 by the QM when document is ready to be submitted and the pdf is generated. For instance, if the deliverable is submitted for the first time, it will be V0.y before it is finalised, and V1.0 when it is ready to be submitted.

The name of the deliverable in the file title, and in the deliverable title (first page of deliverable) should be the exact name of deliverable and not any other one.

2.5.6. Cover page with cartridge

On the cover page, please fill-in the cartridge.

Table 6 – How to fill in the deliverable cartridge

Row name	Please fill in	How to fill in
Dissemination level	Choose an item.	See "Table 7"
Work package	Choose an item.	
Deliverable number	Dx.y	
Version	Vx.y	
First submission date	DD/MM/YYYY	First date of deliverable submission to EC
Last submission date	DD/MM/YYYY	Last date of deliverable submission to EC, if different from first date.
Last due date	DD/MM/YYYY	Due date for the last version. It is the official contractual date mentioned in the Grant Agreement.

Dissemination level mentioned in the cartridge is to be chosen in Table 7:

Table 7 – Deliverable dissemination levels as defined by H2020

Level	PU	PP	RE	CO
Description	Public	Restricted to project partners	Restricted to a group specified by the consortium	Confidential, only for members of the consortium

2.5.7. Authors and Control Sheet

Peer reviewer names and their respective organisations should be filled in by the Deliverable Leader.

Mention what organisation/partner contributed to which sections. E.g "Partner AAA: 3.4, 7.1, 7.5 to 7.8.". The DL is in charge of verifying that each section has at least one contributor.

2.5.8. Table of contents, list of figures, list of tables.

Please update the table of content, the list of figures and the list of tables (if not empty) before submitting the deliverable. Please check numberings. Please make sure that figures and tables are easy to read and not too small and have appropriate titles: captions should be inserted using the automatic numbering in Microsoft Word.

2.5.9. List of abbreviations

Please make sure that all abbreviations used in deliverable are listed. Following abbreviations (Table 8) should be used when necessary.

CCAM is not used anymore, please replace by CAM and search you document for "coop", for "cooperative". But the project title remains as is ('5G for cooperative & connected automated MOBIlity on X-border corridors') as it is the official title of the project, from which the acronym derives.

Table 8 – Abbreviations for countries names

Definition	Abbreviation
China	CN
Germany	DE
Greece – Turkey	GR-TR
Finland	FI
France	FR
Netherlands	NL
South Korea	KR
Spain - Portugal	ES-PT

2.5.10. Executive summary

The executive summary sums up the entire document (unlike an introduction). It has no bullet points.

2.5.11. Introduction

The deliverable introduction includes:

- An introduction to the project, which is required if the dissemination level of the deliverable is "public".
- Purpose of the deliverable.
- Intended audience.
- The impact of COVID-19 pandemic impacts on the activities related to this deliverable : a COVID-19 section shall be added in any deliverable submitted after November 1st, 2020 (see paragraph 1.5).

2.5.12. Conclusion, References, Annexes

The conclusion is mandatory. References and Annexes sections may be removed if empty.

2.5.13. Peer-review form

The peer review form gives a general appreciation of the deliverable and points out the points to be improved. The empty review form is available on SharePoint, in the Deliverables & Working documents folder. The peer review form addresses the points listed below. Reviewers have to rate each point according the following scale and can add comments. Authors may answer each point.

☐ Definitely	☐ Satisfactorily	☐ Somewhat	☐ Not at all	☐ Not applicable	☐ I do not know/ not my expertise

2.5.13.1. Missing parts and essence of the deliverable

- Are there missing chapters / subjects?
- Other changes to the deliverable essence and content

2.5.13.2. Relevance

- Are the deliverable objectives clear and in line with the task activities described in the Description of Action?
- Does the deliverable content respond to deliverable objectives?

2.5.13.3. Conflicts

- Are issues at project level properly treated (e.g. conflicts with other WPs and tasks)?
  NB: conflict resolution is part of the GA and the Consortium Agreement.

2.5.13.4. Soundness of methodology and technical approaches

- Are the results based on a clear methodology, involving user testing, expert opinions, etc.? If not, why do they seem arbitrary?
- Are the technical approaches used appropriate?

2.5.13.5. Quality of achievements

- Are the raised issues relevant?
- Are the achievements clearly stated?
- Are the achievements sufficiently justified and explained? Is there a link between the methodology and the achievements?
- Are the conclusions (if any) valid?
- Does the content of the deliverable contribute to the state of the art?

2.5.13.6. *Clarity*

- Is the content of the deliverable well organised?
- Is the language of good quality?

2.5.13.7. *Deliverable template: layout, spelling, formatting*

Does the deliverable follow the deliverable template format? Please carefully check qualities mentioned in paragraph "2.4.3.8 Content: writing recommendations" of D1.2 Quality Management Plan.

2.5.14. Quality review form

Quality Management team should fill in the Quality Review Form, to give a general appreciation of the deliverable.

2.6. Internal reporting

2.6.1. Organisation contact details

Partners are responsible for keeping their organisation contact details up to date:

- By updating the administrative data on the EC Participant Portal.
- By informing the PC about contact details or internal organisational changes.

The PC is responsible for updating SharePoint and the project contact database.

2.6.2. Meetings and meeting minutes

In order to ensure the internal coordination, internal communication involves the organisation of meetings, whether physical or virtual.

- Categories of meetings are summarised in deliverable D1.1 (Sec. 2.4.2.4.).
- All meeting minutes documents should be named using the following structure: "yyyy mm dd - 5G-MOBIX - meeting name - vX.X.docx".
- A Chairperson who either is the initiator of the meeting or is appointed by the initiator, for example a WPL, leads each meeting. The Chairperson is responsible for producing the meeting minutes using the meeting minutes template. The Chairperson distributes the meeting minutes to attendees for review within 15 days. If there are any comments, the chairperson introduces them in the document and share a reviewed version of the minutes. Attendees have then 15 days to provide a feedback. If there are no comments, the minutes are considered accepted and they are shared with the PC by the Chairperson, and through SharePoint. Meeting categories are defined in D1.1.

2.7. Quality assurance tools

2.7.1. Peer review form

The peer review form has been presented in section 2.5.12

2.7.2. Templates for deliverables, meeting minutes and presentations

Templates are available on the SharePoint platform [Dissemination & events /Templates/]. There are templates for:

- Deliverables (Microsoft Word) (detailed in paragraph 2.5);
- Presentations (Microsoft PowerPoint).

2.7.3. Microsoft SharePoint (online platform)

SharePoint is a web-based project management and collaboration platform from Microsoft. It contributes to project quality because it is used as a single storage platform for project documents and includes a versioning system for deliverables. All draft and submitted deliverables must be saved on SharePoint. Quality management files are also accessible there.

2.7.4. ClickUp (online platform)

As of early 2020, the consortium can access the ClickUp platform, a project management solution that provides detailed monitoring of the project's tasks and work packages. The PMT uses it to check the timing of the technical activities, such as the evolution of the trial sites' experiments and the management of the associated resources.

2.7.5. Deliverable register (MS Excel file)

The QM maintains a deliverable register to have a view on deliverables' status and allocated reviewers that monitors deliverable writing, peer review and submission processes. It also includes the milestones' status and their completion (which is assessed based on EC's acceptance of the project deliverables, available on the EC Research Participant Portal (SygMa) to reflect the latest decisions done by the PMT and recorded by the EC.

The deliverable register has been initially defined using the list of deliverables and milestones described in Annex I of the Grant Agreement and evolves throughout the project according to amendments, technical reviews, revision needs.

Ass seen in Table 9, deliverable types as defined by H2020 are used to qualify deliverables.

Table 9 – Deliverable types as defined by H2020

Type of deliverable	R	DEM	DEC	OTHER
Description	Document, report (excluding the periodic and final reports)	Demonstrator, pilot, prototype, plan designs	Websites, patents filing, press & media actions, videos, etc.	Software, technical diagram, etc.

The deliverable register is located on SharePoint: [Deliverables/Deliverable & milestone register].

3. QUALITY CONTROL ACTIVITIES

3.1. Deliverable life cycle progress in %

The percentages described in Table 10 below can be used as a reference to qualify the state of deliverables, namely, to do deliverable follow-up in the deliverable register. After a deliverable is 100%, it is submitted and can be approved, rejected, or requested to be revised.

Table 10 – Deliverable life cycle progress (percentage)

	State description
10%	Write Table of Content and share work between authors.
40%	At least 50% of the sections of the ToC are completed.
80%	All content of the deliverable is completed and the deliverable is available for peer review.
90%	Deliverable peer-review is done.
100%	The deliverable is submitted to the EC by the PC.

3.2. Peer review

All deliverables should be peer reviewed by two experts within the consortium. The deliverable register on SharePoint shows reviewers' assignments. The peer-review process is part of the deliverable life cycle, described in section **Error! Reference source not found.**2.4.

3.2.1. Selecting peer reviewers

For each deliverable, the WP Leader selects two peer reviewers with the support of the Quality Manager, who may be assisted by the technical manager if no one is found. A third reviewer may be appointed by the QM if needed. Peer reviewers are two experts of the subject developed in the deliverable to be reviewed. Each peer reviewer:

- Works for an organisation within the consortium and this organisation is not a major author of the deliverable to be reviewed;
- Has not personally contributed to the creation of the deliverable to be reviewed;
- Is technically able to evaluate the content of the document;
- Ideally will use the Deliverable in a follow-up task;
- Is able to evaluate whether the deliverable is aligned with the scope and objectives of the 5G-Mobix project.

3.2.2. Template email to launch a peer review

The WPL or the DL invites peer-reviews via an email. To help you, an exemplar email is:

"Dear Colleagues,

I would like to kindly invite you to offer your reviewing service for <DELIVERABLE NUMBER AND NAME> which is due for submission on <DATE>.
According to Quality Management procedures, we aim at the following timeline:

[DATE (deadline – 1 month)] Upload DX.Y for peer-review in *this folder* (SharePoint Deliverable & Working documents / Draft version folder / Dx.x). Each review should be uploaded here (SharePoint Deliverable & Working documents / Draft version folder / Dx.x / Reviews folder) and is composed of two documents:

- The deliverable MS Word document, with comments and suggestions made with the "track changes" mode,
- The completed review form.

[DATE (deadline - 20 days) EoB] Deadline for peer review. In parallel Quality review will be processed by Quality Management Team
[DATE (deadline – 15 days) EoB] Send the final version to the Quality Manager and to ERTICO.
[DATE (deadline – 2 working days)] After a final quality check, Quality Manager generates pdf version to be submitted.
[DATE] Deadline for submitting the deliverable to the EC by ERTICO.

Please let me know about your availability as soon as possible, but not later than .....

Many thanks in advance.

Kind regards,
Xxx"

3.2.3. Peer review output documents

Each reviewer gives two documents:

- The deliverable document (in MS Word format), with peer reviewers' comments and suggested modifications made in "track changes" mode.
- The completed peer review form, to be stored on SharePoint in the Deliverables & Working documents / Drafts / Dx.x... / Review folder. See section 2.5.12.

3.2.4. For DL and WPLs: how to take into account peer reviewers' comments?

The deliverable leader has the final decision concerning the handling of reviewers' feedback. She/he may decide not to take comments into account. In this case, the deliverable leader should answer the comments that are not taken into account in a commented copy of the final version of the deliverable, for example: "comment rejected for reason …" or "useful comment but …". The DL can contact the reviewers if necessary.

3.3. Quality requirements for trials preparation and management

3.3.1. Roll-out plan

A roll-out plan must be defined and documented to describe the activities to be performed on each trial site and the interactions between them (both technical and administrative). This plan serves as a reference for the rest of the project. It is described in D3.1 – "5G-MOBIX Roll-Out Methodology and Roadmap defined" and must therefore be known to all partners involved in the experimental part of 5G-MOBIX.

This roll-out plan includes, for each trial site activity:

- The activity ID and if relevant the use case ID,
- The activity title,
- The timeline (start month, end month),
- The end month (e.g. M11),
- The target completion date and phase.

Three roll-out phases have been initially identified, allowing the activities on each trial site to be conveniently coordinated. These phases are detailed in D3.1.

The following principles apply:

- Any deviations between the plan and the trial sites must be identified and controlled by the WP leader as early as possible.
- Additional information, comment and graphical display of information may be added to clarify or precise the roll-out plan, for example to visualize the different phases.
- Any graphical view resulting from a trial site should be of adequate quality and the text should be big enough to be easily read.

3.3.2. Steps in trial sites

Each trial site may be associated with a set of steps, which should be clearly identified through the roll-out plan in order to create meaningful and understandable checklists. These checklists might be of interest for the trial site leader, but also for the WP leader, the QM and the PM to check the overall progress and consistency of the activities carried out in a trial site. These steps are highly correlated with the use-cases

and user stories that are defined in each trial site (see Deliverable 2.1). They include, but are not limited to, the following items:

- Integration of developments associated to the use case.
- Laboratory testing of the use case and fine-tuning development (or through, e.g. simulation tools as defined in WP5).
- Validation of the use case in a controlled environment.
- Recruitment of participants.
- Mature and real-world testing.
- Validation and exploitation of the results.

3.4. Milestones monitoring

Milestones have been defined to ensure that the project progresses and is on schedule. These milestones are monitored using the deliverable register file on SharePoint (second tab) and are checked each bi-weekly PMT by project managers and the PC to ensure their successful completion. This way we can combine the assessment of the milestones with the COVID-19 measures as the implication of COVID-19 is also assessed during the PMT and monthly recorded on SharePoint.

The milestones, as of March 2020, are listed in Table 11 below.

Table 11 – Milestones (as of December 2021)

Milestone number	Milestone title	WP number	Lead beneficiary	Due Date (in months)	Means of verification
MS1	Project kick-off	WP1	1 – ERT	1	Kick-off Meeting of the project Means of verification: Minutes of the kick-off meeting
MS2	Specifications completed	WP2	2 – AALTO	12	All the specification for the 5G architecture and technologies for CCAM specifications for the use cases will be completed. Means of verification: D2.1 to D2.5 available
MS3	Roll-out plan, evaluation methodology and plan, dissemination	WP3, WP5, WP7	45 – WINGS	16	Roll-out plan, evaluation methodology and plan, dissemination and exploitation plan ready

	and exploitation plan ready				Means of verification: D3.1, D5.1 and D7.1 to D7.4 available
MS4	Roll-out completed and tested, pilot site protocol, deployment enablers plan ready	WP3, WP4, WP6	23 – INTRA	23	Roll-out completed, pilot site protocol, deployment enablers plan ready Means of verification: D3.2 to D3.6, D4.2 and D6.1 to D6.4
MS5	Revised specifications and roll-out reports, end of trials	WP2, WP3, WP4	41 – VED	33	Revised specifications and roll-out reports, end of trials Means of verification: D2.6, D3.7 and D4.3
MS6	Evaluation, deployment enablers and dissemination & exploitation actions completed and final event	WP1, WP2, WP3, WP4, WP5, WP6, WP7, WP8	1 – ERT	39	Evaluation, deployment enablers and dissemination & exploitation actions completed and final event Means of verification: Final event report, D5.2 to D5.4, D6.5 to D6.8, D7.5 to D7.7

3.5. Deliverable status measurements

Below are displayed measurements of deliverables quality at the beginning of February 2021. Figure 1 shows the global status of deliverable for the project, Figure 2 shows this information per WP. This information will be reported each 6 months.

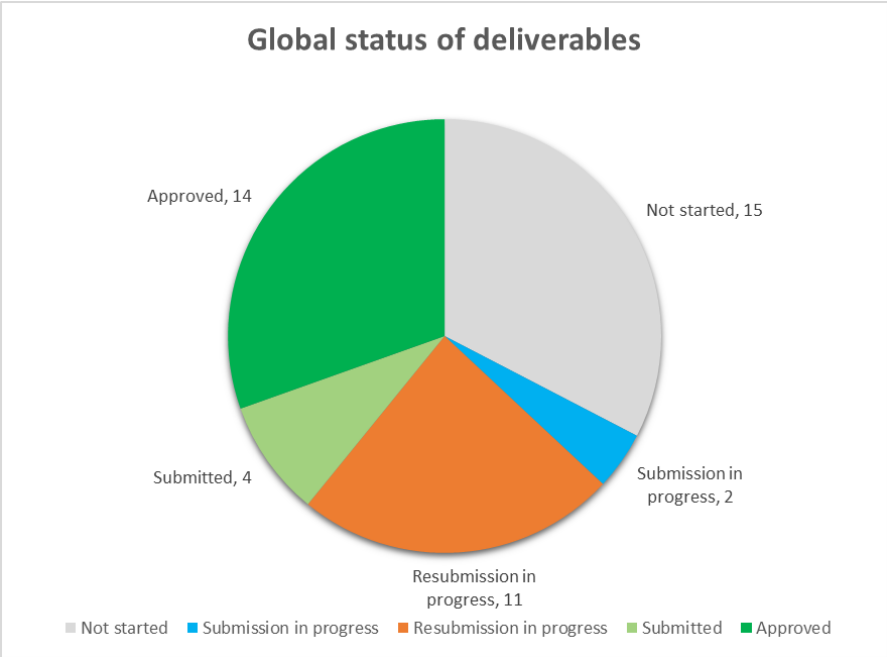

Figure 1 - Global status of deliverables

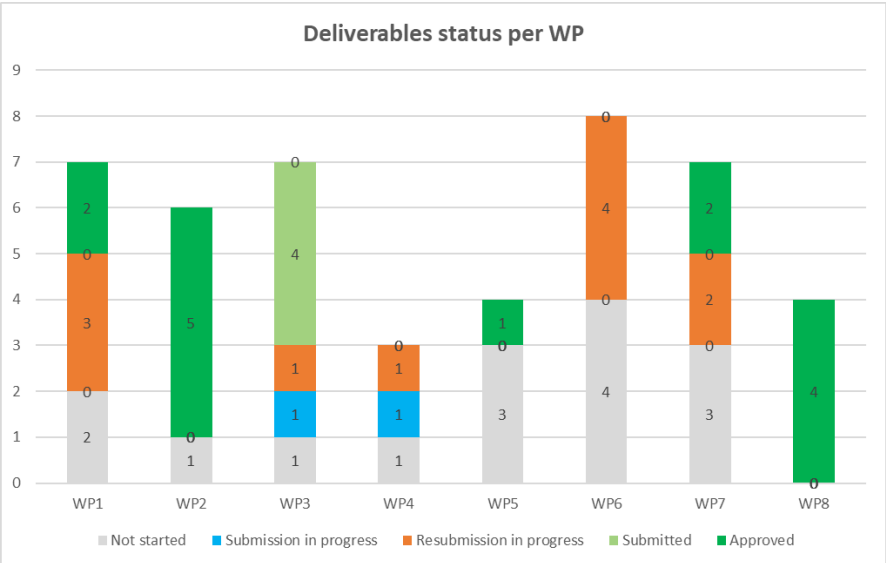

Figure 2 - Deliverable status per WP

Finally, Figure 3 below displays the **progress** of deliverables status per six months. It has to be noticed that the last month should be M30 since it is reporting each 6 months. But in order to have the last information in this deliverable that is to be submitted in M28, the last month displayed in the graphs is M28 (information being from beginning of month 28 – February 2021).

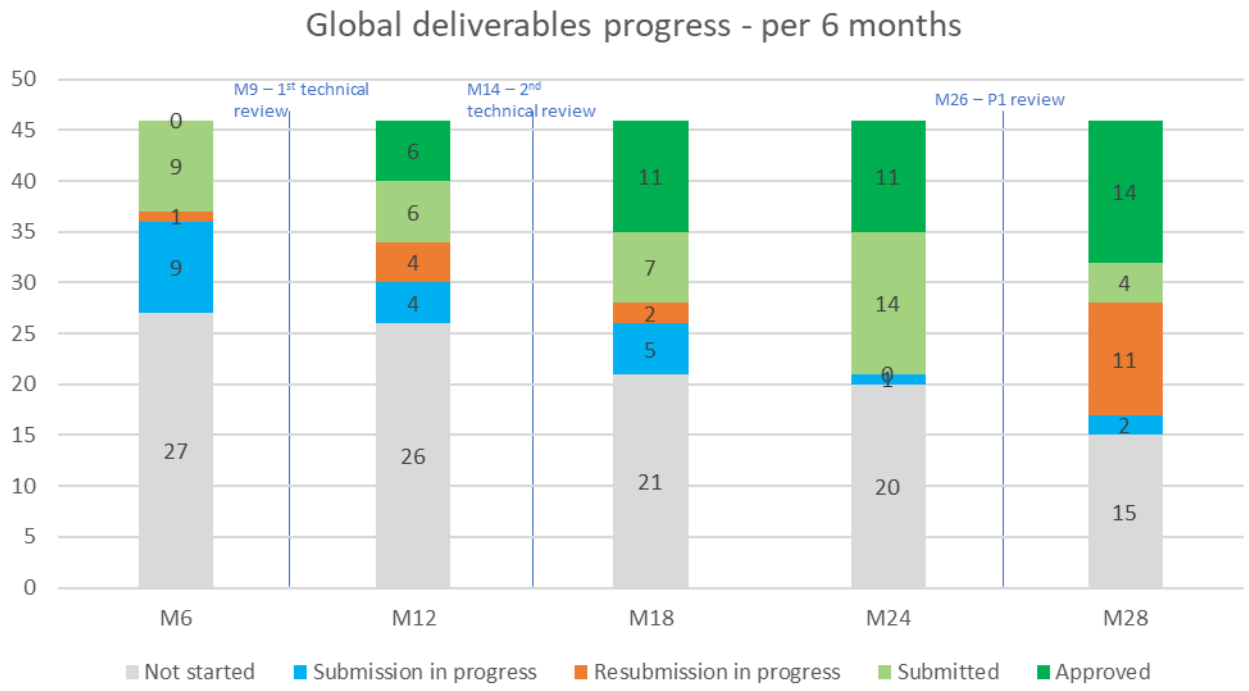

Figure 3 - Global deliverables progress per 6 months

4. CONCLUSION

The quality management plan (D1.2) covers the procedures, control measures and operating practices intended to ensure that all activities in 5G-MOBIX are carried out with a high standard of quality. It complements the project management plan (D1.1) and must be followed to ensure the proper implementation of the project and the high quality of its deliverables. This work is also crucial to the other project tasks and serves as a reference point for process monitoring, in both technical and managerial terms.

Together with the Grant Agreement and the Consortium Agreement, this document is to be regarded as a reference for the overall project quality management of 5G-MOBIX.