

The 5G Infrastructure Public-Private Partnership

Test, Measurement, and KPIs Validation (TMV) WG – Status, lessons learned & path to completion



5G-PPP to SNS JU Passing the Torch event 25 May 2023 Vangelis Kosmatos (WINGS), Michael Dieudonné (Keysight), Anastasius Gavras (Eurescom), Ioanna Mesogiti (Cosmote), Luca Valcarenghi (SS Sant'Anna), Ioannis Patsouras (ACTA) and all

TMV WG



The European path towards global next generation

- Quick overview
- Highlights
- Lessons learned
- Path to completion



Quick overview – TMV WG History and Structure

History

- 5G-PPP Test, Measurement, and KPIs Validation (TMV) WG established in Feb. 2019 (active more than 4 years)
- Initial idea from Maurizio Cecchi (PIIU), Mauro Boldi (TIM) and Manuel Lorenzo (Ericsson)
- Started as a joint activity of 5G EVE and 5G-VINNI (ICT-17 projects)
- Quickly extended to many projects addressing 5G / B5G / 6G KPIs, monitoring, trial results

Structure

- Co-chaired by Evangelos Kosmatos (WINGS ICT Solutions) and Michael Dieudonné (Keysight)
- Core team of about 15 partners (active participation and bi-weekly telcos for synch)
- A larger team of contributors (ad hoc based) from projects
- Support from 6G-IA (Kostas and Alex)
- Close collaboration with TB (Mikael)

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Quick overview – TMV WG Vision



- Promote commonalities across projects that have strong interest in Testing, Monitoring and Validation methodologies
- Provide insights from the analysis of trial results from 5G-PPP projects
- Research areas and technology domains
 - KPI definition, KPI sources, collection procedures and analysis
 - Testing frameworks (requirements, environment, scenarios, expectations, limitation) and tools
 - Testing methodologies and procedures
 - KPI validation methodologies
 - Testing lifecycle (i.e., testing execution, monitoring, evaluation and reporting)
 - Common information models for T&M





- Publication of 8 whitepapers
- Contribution to ETSI INT
- Contribution to ITU Working Party 5D (WP5D)
- Organization of two workshops
- Establishment of two Task Forces (TFs)
- Realisation of around 60 telcos + TF telcos

ETSI TR 103 761 V0.0.5 (2021-04)



Core Network and Interoperability Testing (INT) Methodologies for E2E Testing & Validation of Vertical Applications over 5G & Beyond networks

5 PPP **Highlights** The European path towards global next generation Vertical / Service / **ICT-17 Mature results from ICT-17 KPI** information architecture, projects and initial results from 5G-PPP context, scenarios, from some ICT-19 projects projects methodologies communication network **Vertical Task Force (TF) TMV WG** Establishment **Analysis and** Relate with the 5G common insights from verticals and their terminology and initial 5G results actual needs frameworks Validating 5G Technology Service performance **Understanding the Numbers Performance Assessing 5G** measurement methods - Contextualization and architecture and over 5G experimental **Impact Factors of 5G Application Scenarios** networks **Performance Results** Whitepaper (June 2019) Whitepaper (June 2021) Whitepaper (May 2021) **April 2021 Contribution to ETSI INT in TR** about recommendation on **Application Testing and Validation** 6 31/05/2023 **Frameworks**

5 PPP **Highlights** Start of B5G/6G projects The European path towards global next generation **Software** Monitoring tools used in 5G **KPIs from B5G** contributions from projects. Baseline for B5G projects (ICT-52) **ICT-17 projects** projects. (5G VINNI) communication network **Basic software** starter kit for 5G monitoring and **B5G KPI definition** validation tools 5G KPIs and taxonomy verification Beyond 5G/6G KPIs and **KPIs Measurement Tools -Basic Testing Guide - A** **Target Values** Starter Kit for Basic 5G From KPI definition to KPI validation enablement **KPIs Verification** Whitepaper (Nov. 2021) Whitepaper (June 2022) Whitepaper (May 2023) Feb. 2023 Whitepaper "Beyond 5G/6G KPIs and Target Values" disseminated into ITU Working Party 5D (WP5D) 31/05/2023

Highlights



8

The European path towards global next generation communication network

KPI Monitoring Final 5G trial methodologies results from 5Gfrom B5G projects **PPP** projects (ICT-52) **EMF TF Document on EMF Challenges** July 2023 **Analysis and B5G KPI** insights from monitoring **Final Report** the final 5G methodologies results Sept. 2023 **5GPPP Trials Results 2022 B5G/6G KPI Monitoring** KPIs measured in advanced 5G Trial Sites Whitepaper (June 2023) Whitepaper (June 2023)

31/05/2023

Lessons learned



- Lesson 1: "In order to collect meaningful data from the projects you need a meaningful template"
 - Well defined templates with specific questions helped us to analyse data in a structured and efficient way.
- Lesson 2: "You need at least two rounds of interactions for collecting data"
 - First round collect data and then second round for specific feedback and clarifications
- Lesson 3: "The insights are hidden in the context"
 - In order to provide meaningful insights, we dig in and analyse the context. In case of trial results, we analysed the trial scenarios (technologies, applications, environment, tools)

31/05/2023

Lessons learned



- Lesson 4: "In order to progress quickly the first thing you need is a common terminology and framework"
 - This was our first step both in 5G and B5G. Define terminology and framework, define common KPIs, define methodologies and tools.
- Lesson 5: "The evolution of KPI definition and monitoring should follow closely the evolution of technologies"
 - We tried to address B5G KPI definition and monitoring very early in order to identify gaps and identify the evolution of the tools.
- Lesson 6: "The synergies among projects (although underrated) and the generation of references (e.g. architectures, methodologies) avoid the overlapping of activities and speed up the overall progress"
 - We try to find commonalities (e.g. generate KPI families, common tools) and generate reference (architectures, methodologies, basic tools) when possible.

Path to completion



- Two whitepapers under review by SB/TB, to be published on 2nd June 2023 -> Total 8 whitepapers
- Document on EMF Challenges to be published by July 2023
- TMW WG Final report generation is ongoing, to be finalised by end July 2023



Thank You!!!



communication network