5G Solutions for European Citizens

The 5G Infrastructure Public Private Partnership

5G Trials in Europe – 5G Experimentation Facilities and Vertical Trials
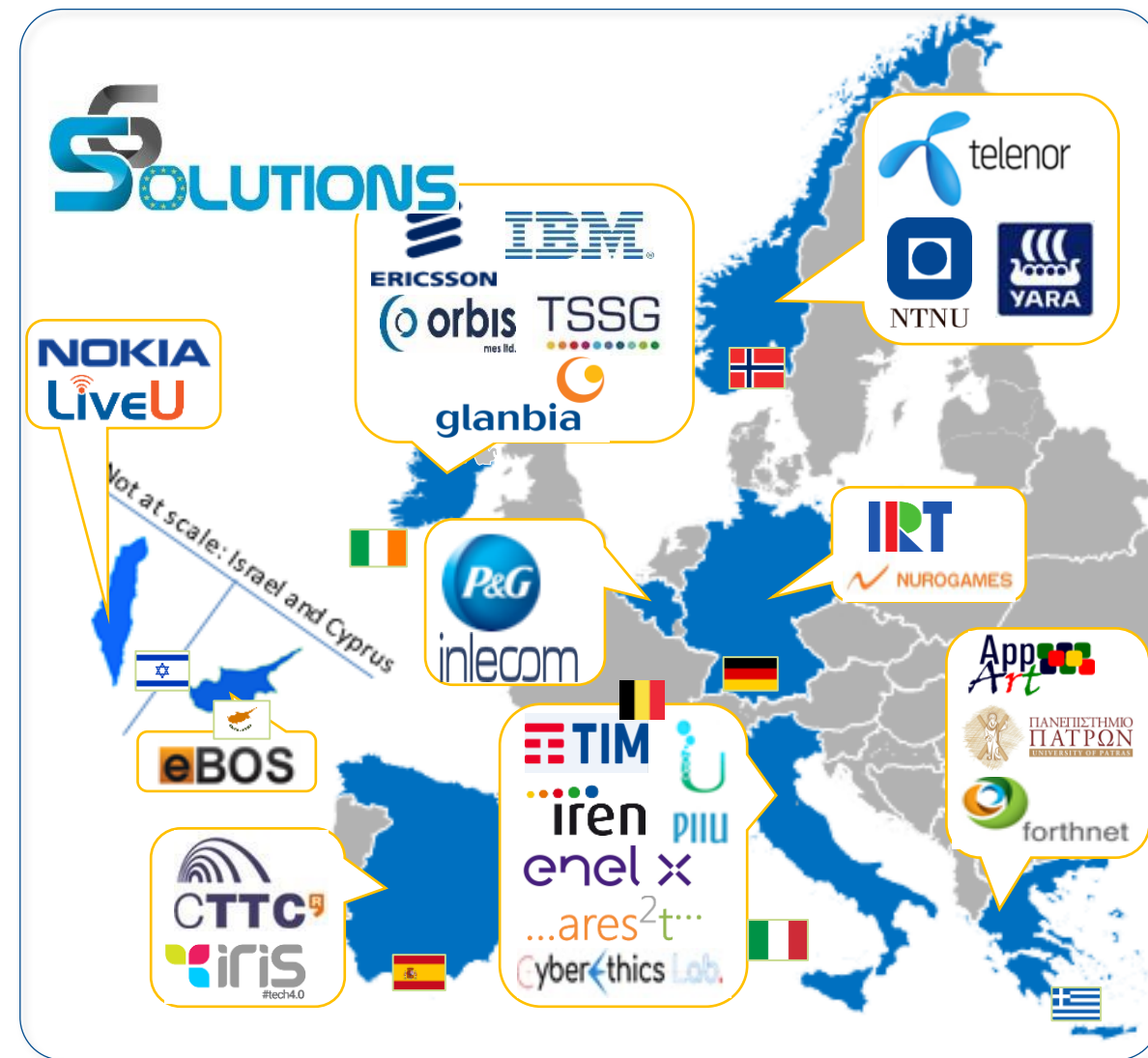
5G-SOLUTIONS – 5G Solutions for European Citizens

Andrea Di Giglio, (TIM)

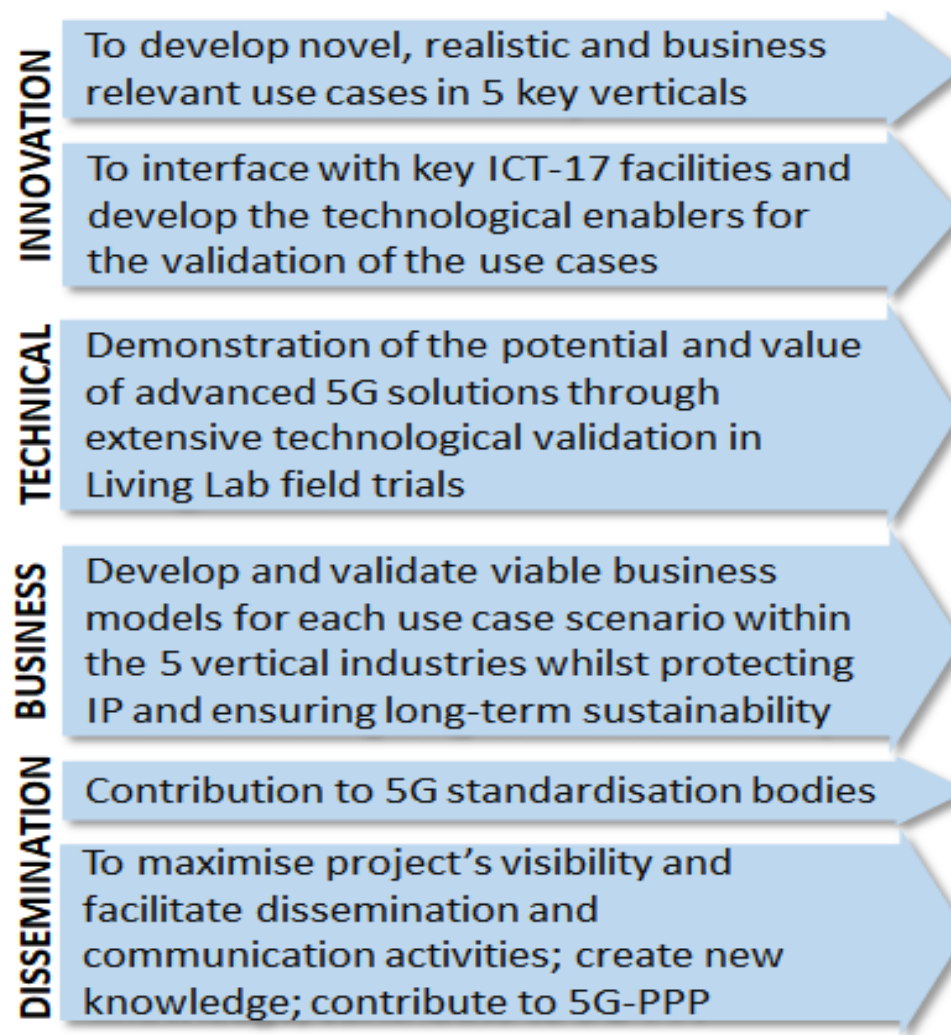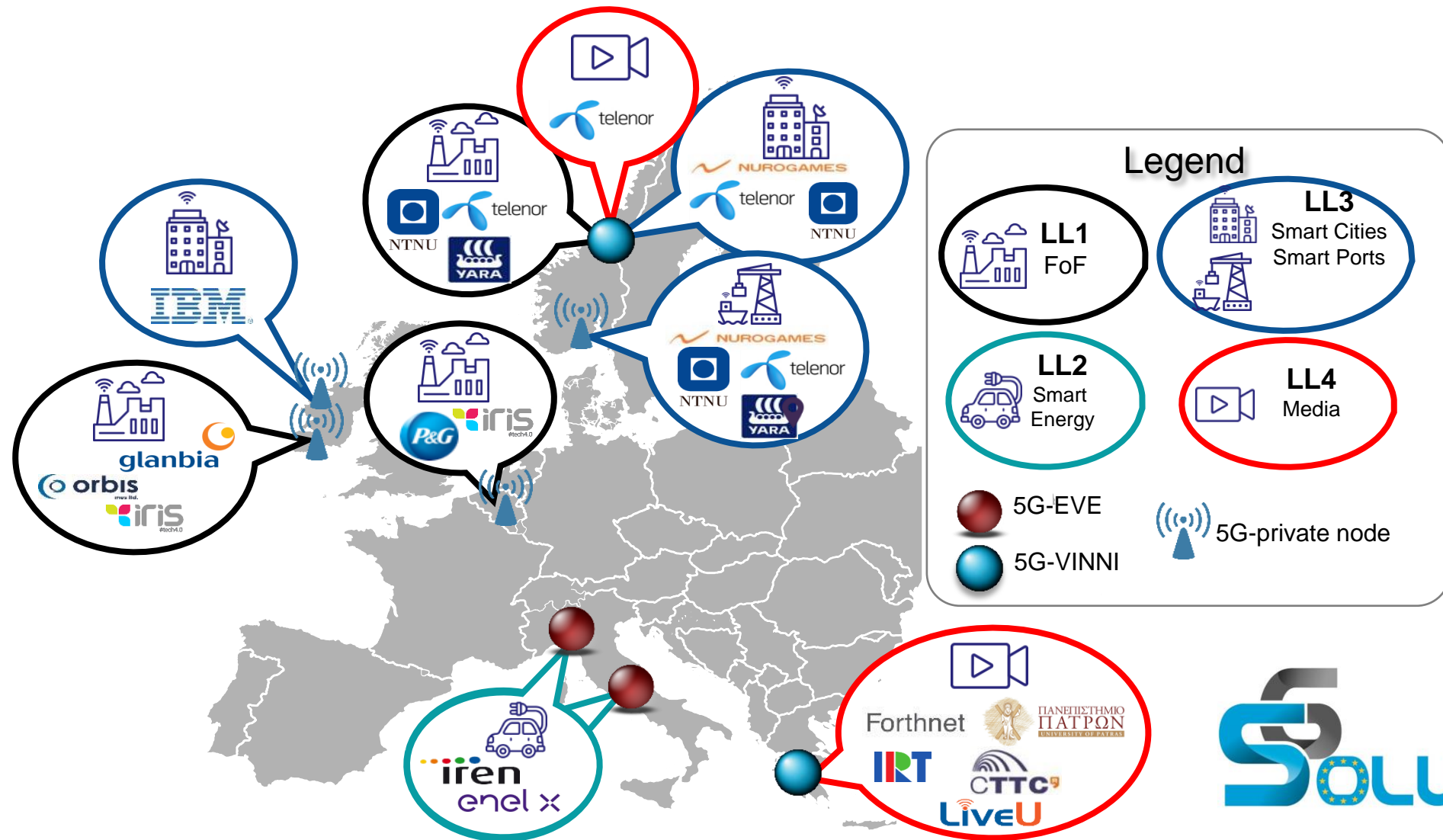Online, October 14th 2020

Who we are

- **Topic:** ICT-19-2019   **Type of Action**: RIA
- **Proposal No**: 856691
- **Duration:** 36 months
- **Budget:** €14.293.850
- **Consortium members:** 26 partners from 9 EU member states and associated countries (Israel, Norway)
- **Project coordinator:** Andrea Di Giglio (TIM)
- **Technical Manager:** Håkon Lønsethagen (Telenor)
- **13 partners in existing 5G-PPP Phase 1-3 projects**
- **3 Telecom Operators**: TIM, Telenor and Forthnet
- **2 Telecom Vendors**: Ericsson, Nokia
- **7 Large Industries**: ENEL, GLANBIA, IBM, IREN, P&G, YARA
- **2 Research Centers**: CTTC, PIIU
- **3 Universities**: NTNU, Patra, TSSG (WIT)
- **10 SMEs**: ARES2T, APP-ART, CyberEthicsLab, EBOS, INLECOM, IRIS, IRT, LIVE-U, NUROGAMES, ORBIS
- **Website:** https://5gsolutionsproject.eu

INNOVATION

To develop novel, realistic and business relevant use cases in 5 key verticals

To interface with key ICT-17 facilities and develop the technological enablers for the validation of the use cases

TECHNICAL

Demonstration of the potential and value of advanced 5G solutions through extensive technological validation in Living Lab field trials

BUSINESS

Develop and validate viable business models for each use case scenario within the 5 vertical industries whilst protecting IP and ensuring long-term sustainability

DISSEMINATION

Contribution to 5G standardisation bodies

To maximise project's visibility and facilitate dissemination and communication activities; create new knowledge; contribute to 5G-PPP

What services and use cases do you see for 5G?
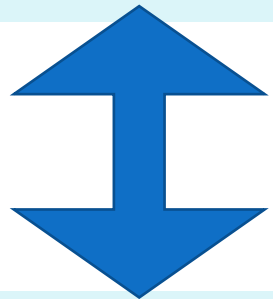
Mission

5G-SOLUTIONS aims to prove and validate that the 5G capabilities provide prominent industry verticals with ubiquitous access to a wide range of forward-looking services with orders of magnitude of improvement over 4G, thus bringing the 5G vision closer to realisation.

- *Factories of the Future*
- *Smart Energy*
- *Smart Cities*
- *Smart Ports*
- *Media & Entertainment*

a unified cross-domain end-to-end service orchestration enabling multi-domain slicing and 5G service lifecycle automation

an innovative smart KPI visualisation system. 5G-SOLUTIONS will validate more than 140 5G network-specific technological KPIs corresponding to 20 innovative and compelling industry use cases
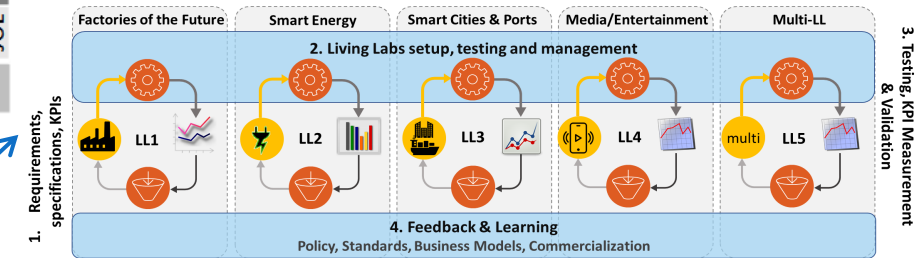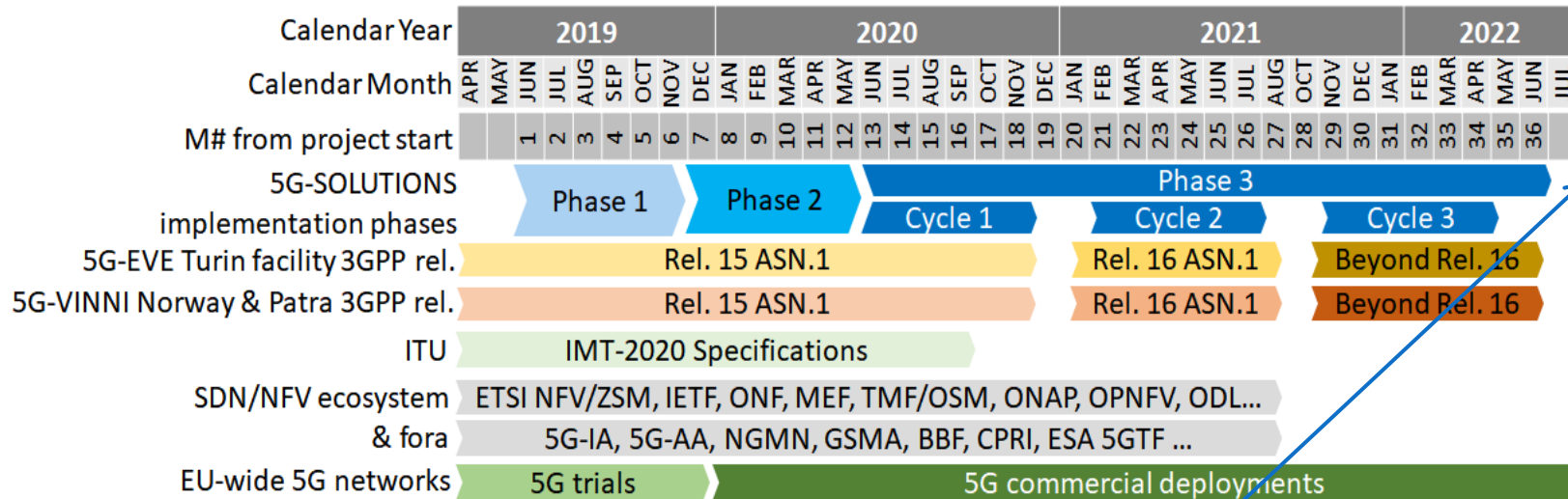
- *Technical Validation*
- *Business Validation*
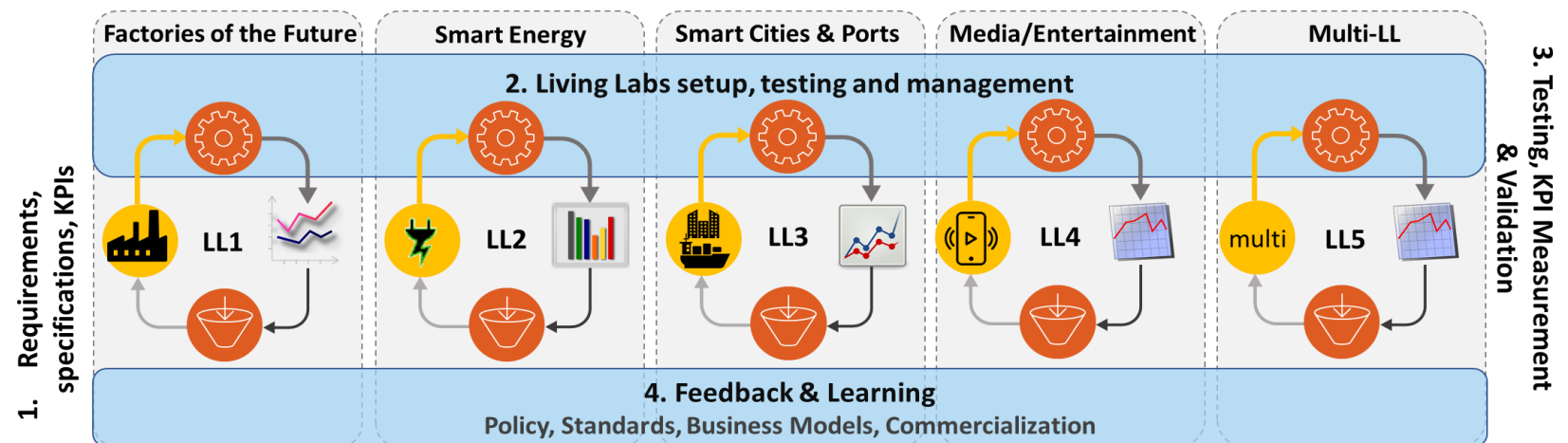
What are the benefits of 5G?

Expected Impact Indicators	Target values with respect to 4G
Network slicing	Meet target KPI values during infrastructure, spectrum and RAN sharing and network slicing.
Multi tenancy & flexibility	
Traffic type	
User data rate	Guaranteed user data rates >50Mbps
Latency	10-fold less (<1ms) with less than 10% jitter
Reliability	>99.999%
Positioning accuracy	<1m for outdoor devices

- Reducing **environmental pollution**
- Providing a **wider approach to smart city**
- Reducing **both CAPEX and OPEX of energy consumption**
- Improving **safety and reducing crime**
- **Productivity** gains in the manufacturing sector thanks to process optimisation inside digital factories

Living Lab title	Technological KPIs					
	Data Rate (Mbps)	Mobility (km/h)	Latency (ms)	Connection Density (devices/m²)	Reliability (%)	Positioning Accuracy (m)
LL1: Factories of the Future	**>100**	>30	**<5**	**>0.1**	**>99.999**	**<0.5**
LL2: Smart Energy	-	-	**<10**	>10^{-2}	**>99.999**	-
LL3: Smart Cities & Ports	**>100**	-	**<10**	**>1**	>99.99	**<0.5**
LL4: Media & Entertainment	**<1000**	<100	<100	**>1**	>99.99	<10

Calendar Year	2019									2020													2021												2022				
Calendar Month	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
M# from project start		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		

5G-SOLUTIONS implementation phases: Phase 1, Phase 2, Phase 3 (Cycle 1, Cycle 2, Cycle 3)

5G-EVE Turin facility 3GPP rel.: Rel. 15 ASN.1 / Rel. 16 ASN.1 / Beyond Rel. 16

5G-VINNI Norway & Patra 3GPP rel.: Rel. 15 ASN.1 / Rel. 16 ASN.1 / Beyond Rel. 16

ITU: IMT-2020 Specifications

SDN/NFV ecosystem & fora: ETSI NFV/ZSM, IETF, ONF, MEF, TMF/OSM, ONAP, OPNFV, ODL...; 5G-IA, 5G-AA, NGMN, GSMA, BBF, CPRI, ESA 5GTF ...

EU-wide 5G networks: 5G trials / 5G commercial deployments

Phase 2 gate: Readiness of the 5G ecosystem to conduct Living Lab trials (M12), related to MS2	
Phase 3 – Validation, demonstration & impact maximisation	Iterative execution of 20 use cases in LLs over 3 consequential and iterative cycles of testing, at least once per 3GPP release. **Iteration** is necessary to ensure that potential feedback improvements are applied to all solution components thus enabling regression testing to ensure baseline target KPIs are met. This phase also includes **dissemination, innovation, commercialisation, capacity building** and data management activities in WP8 and WP9.

Contact Details

thank you!

🏢 TIM

👤 Andrea Di Giglio

✉️ andrea.digiglio@telecomitalia.it