NGMN

NEXT GENERATION MOBILE NETWORKS ALLIANCE

AN OVERVIEW

Chris Hogg, Executive Programme Manager, NGMN Alliance

www.ngmn.org

WE MAKE BETTER CONNECTIONS

GLOBAL PARTNERSHIP

More than 80 Companies and growing

MEMBERS

1&1, A1 Telekom Austria Group, Bell, BT, 中国移动 China Mobile, 中華電信 Chunghwa Telecom, T-, kpn, docomo, orange, Singtel, SK telecom, Smart, TELE2, Telefónica, Telia, TELUS, TIM, T-Mobile, TURKCELL, uscellular, vodafone, WINDTRE

CONTRIBUTORS

6WIND, amdocs, Amphenol, Anritsu, Apple, AVANCI, CISCO, Comba, COMMSCOPE, 大唐电信科技产业集团, Deloitte., ERICSSON, FUJITSU, Google, Hewlett Packard Enterprise, HUAWEI, HUBER+SUHNER, IBM, intel., interdigital, JUNIPER NETWORKS, KEYSIGHT TECHNOLOGIES, lenovo, LG Electronics, MAVENIR, MAXAR, Meta, NEC, ngvoice, NOKIA, PreHCM Services, PROSE, Qualcomm, Radiall, ROHDE&SCHWARZ, TONGYU COMMUNICATION, umlaut, Vecta, ZTE

ADVISORS

ASTRI, EURECOM, Fraunhofer, 工業技術研究院, 財團法人資訊工業策進會, JOHNS HOPKINS APPLIED PHYSICS LABORATORY, KING'S College LONDON, 國立中興大學, RWTH AACHEN UNIVERSITY, SWITCH, Technische Universität Braunschweig, TECHNISCHE UNIVERSITÄT DRESDEN, TNO innovation for life, UNIVERSITÄT DUISBURG ESSEN, Universität Stuttgart, UNIVERSITY OF TORONTO

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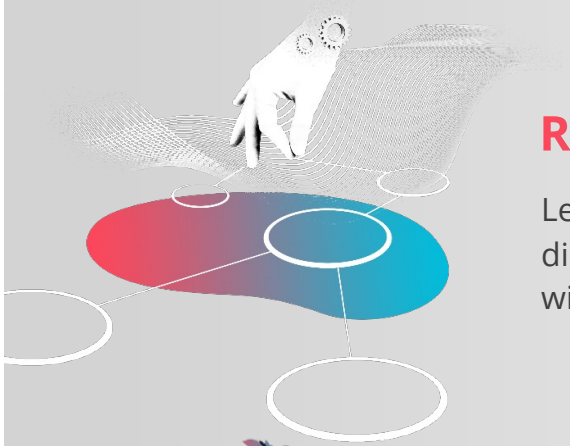
STRATEGY

Alongside with projects supporting 5G's full implementation, the focus of NGMN's Work Programme since 2021 is on three main equally important pillars with different time horizons

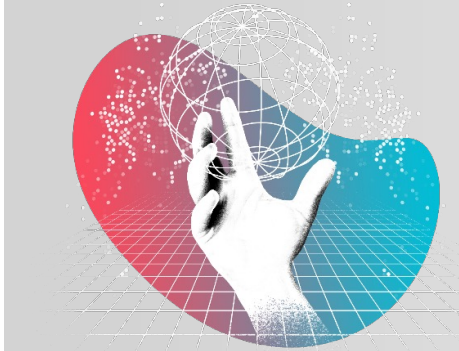


ROUTE TO DISAGGREGATION

Leading in the development of open, disaggregated, virtualised and cloud native solutions with a **focus on the E2E Operating Model**

GREEN FUTURE NETWORKS

Building sustainable & environmentally conscious **solutions**



6G

Emergence of 6G highlighting **key trends across technology and societal requirements plus use cases, requirements and design considerations** to address

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NGMN WORK PROGRAMME

STRATEGIC FOCUS

MASTERING THE ROUTE TO DISAGGREGATION
(Digital Transformation)

SUSTAINABILITY / GREEN FUTURE NETWORKS

6G

SUPPORTING 5G'S FULL POTENTIAL

REALISATION

NETWORK DISAGGREGATION E2E OPERATING MODEL (ODiN)

Network Automation

GREEN FUTURE NETWORKS
Energy Efficiency and Metering
Circular Economy

6G REQUIREMENTS
E2E Requirements

Slicing for Device OS

5G Trial & Testing

Base Station Antenna Architecture (BASTA)

ACCOMPANYING & SUPPORTING ACTIVITIES

IPR (DORMANT)

SECURITY COMPETENCE TEAM

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COOPERATION PARTNERS

COOPERATION ACTIVITIES

JOINT PROJECT WORK

- Project activities in areas of interest for both organisations
- Publication of joint deliverables, requirements and recommendations
- Efficient exchange of information during project work

JOINT MARKETING

- Promotion of deliverables and publications
- Cross-marketing of conferences & events
- Speakers, moderators, exhibition at NGMN IC&E

EXAMPLES

Regular exchange of information on work programme activities and joint work based on bi-lateral agreements

- 3GPP – Participation in PCG meeting as MRP, liaison statements on requirements
- 5G ACIA – Regular exchange of information on requirements, 5G and beyond
- ETSI – Participation in General Assembly, liaison statements on requirements
- GCF – Regular exchange of information on 5G Devices & Chipsets
- GSMA – Exchange on edge cloud activities, Green Future Networks a.o.
- GTI – Joint publication of 5G Smart Devices Supporting Network Slicing
- ITU – Contribution to IMT.Future Technology Trends
- Linux Foundation – joint activities for Operating Disaggregated Networks, Cloud Native, virtualization, Network Automation, Green Future Networks
- O-RAN ALLIANCE - Exchange on the RAN decomposition for 5G networks
- TM Forum – specific themes like Operating Disaggregated Networks

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OPERATING DISAGGREGATED NETWORKS

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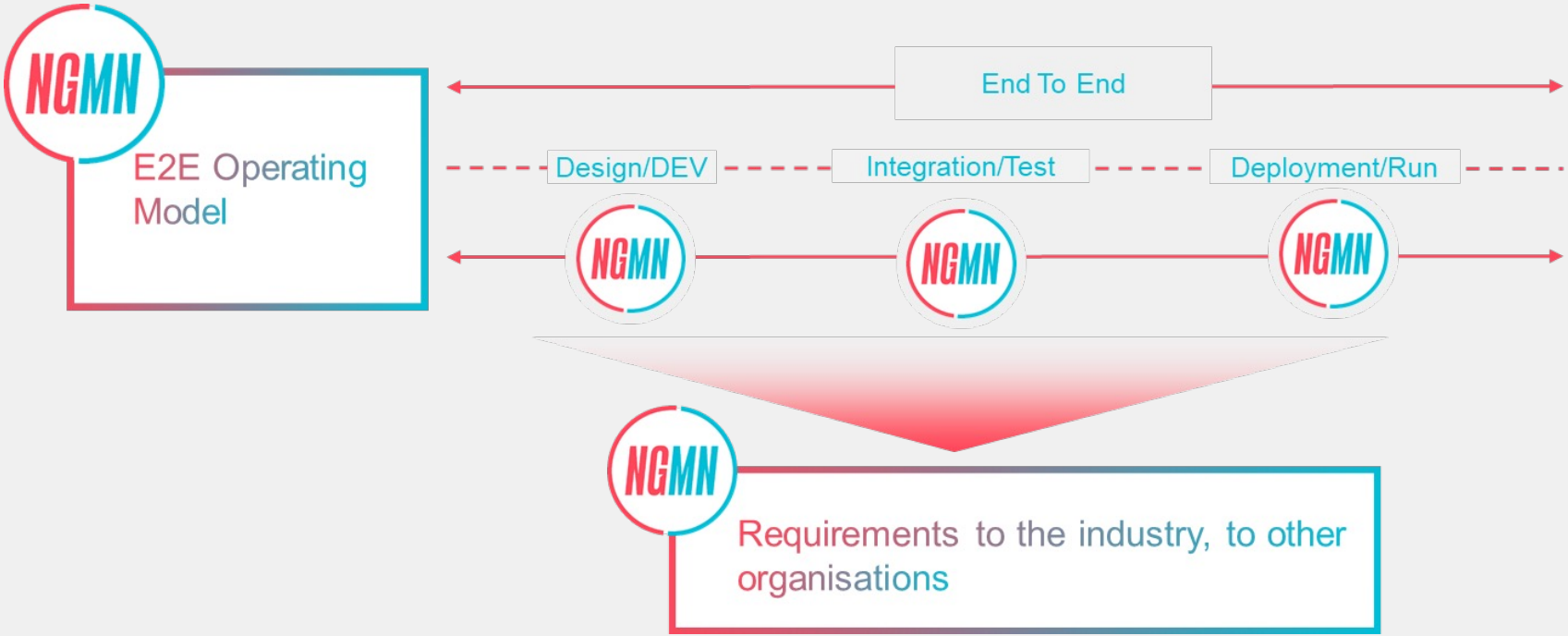
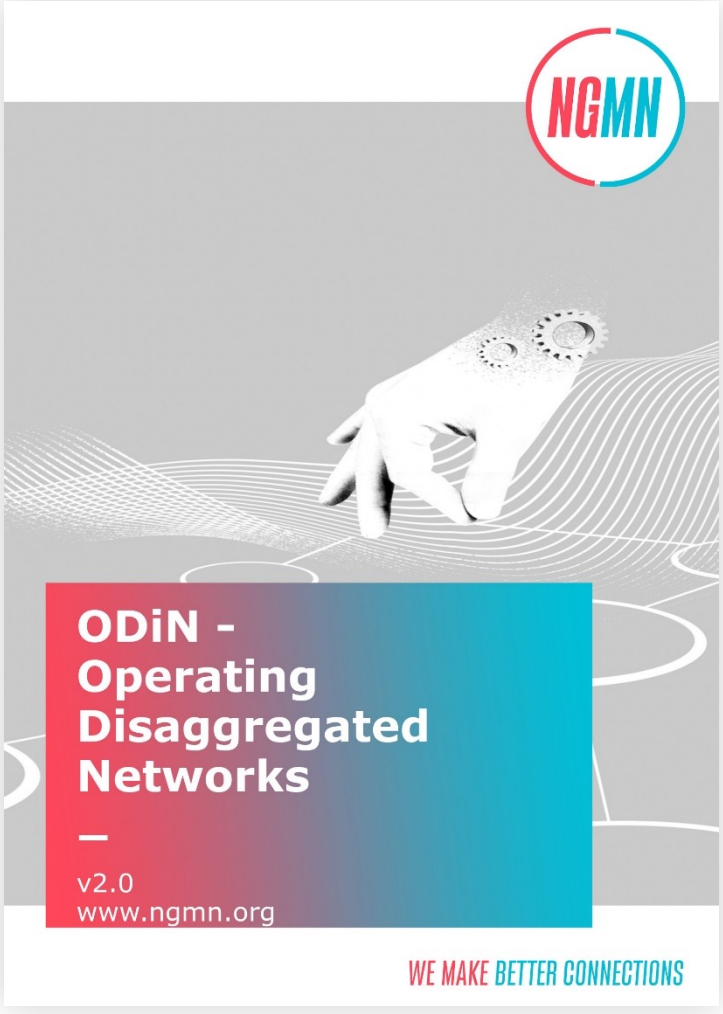
E2E OPERATING MODEL BY NGMN

RAN, CORE & TRANSPORT

The End-To-End Operating Model for disaggregated networks was not covered yet by other organisations. NGMN is well positioned to add value in this area.





OPERATING DISAGGREGATED NETWORKS V2.0

- **Impact to operational processes** (RAN / Core / Transport)
  - Planning
  - Deployment
  - Maintenance
  - Optimisation
  - Service Providing

- **Cloudification** and impact on operators
- Evolution of **Network Testing**
- **DevSecOps** and **Network Automation**

Building towards providing deployment scenarios and **operating model blueprints in phase 3 (starting now)**

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GREEN FUTURE NETWORKS

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TELCO SUPPLY CHAIN SUSTAINABILITY

KEY RECOMMENDATIONS

Sourcing Criteria	Evaluation
Net Zero Targets	Is the vendor/supplier setting net zero targets matching to the operator?
Renewable Electricity usage	Is the product manufactured using as close to 100% renewable electricity as possible (depending on the availability)?
SBTi commitment	Is the vendor/supplier setting science-based targets?
CDP reporting	Is the vendor/supplier reporting emissions in CDP and is this data verified by a trusted third party?
Independent ESG rating tools	Is the vendor able to provide any independent ESG rating matching to the threshold of your strategy
Waste Management	Is the vendor setting targets and KPIs for moving towards zero E-waste?
Water Footprint reporting	Is the vendor reporting the water consumption (during product manufacturing, cooling, etc)?
Product modularity	Is the product modular?
End of lifecycle/Reusability/ Recyclability	Is the product reusable/recyclable?
Reselling	Is the vendor enabling the reselling of the product?
Repairability	Is the product repairable?
Take back program	Is the vendor offering a take back option?
Packaging	Is the product packed in an eco-friendly manner (as less material as possible, no single use plastic, recycled material usage)?
Product housing and packaging	Is the product housing and packaging eco-friendly?
Alignment with RBA	Is the supplier aligned with the code of conduct from the Responsible Business Alliance?
LCA availability	Is the product's LCA available according to the recognised standards?
PCF availability	Is the Product Carbon Footprint available according to the recognised standards?
Energy consumption	Is the product energy efficient?
Conflict minerals/hazardous substances	Is the product containing hazardous substances?
Social impact	Is the vendor compliant according to sustainable supply chain conditions including child labour, occupational and health safety, human rights, etc.?

23

1. **Adopt ESG** (Environmental Social Governance) goals as an **integral part of the operator's objectives**
2. To reduce scope 3 emissions, **ensure alignment of major stakeholders** (in particular suppliers) with the ESG goals
3. **Update processes** to include ESG
4. **Encourage suppliers to disclose carbon emissions data**

Sourcing criteria checklist is available!

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KPIs FOR GREEN NETWORKS ASSESSMENT

KEY RECOMMENDATIONS

Table 1: Environmental KPIs and their thresholds

	KPI Name	Target value Maximum threshold	Other thresholds
1	Sustainability reporting with audit	Sustainability report with the auditing company mentioned	
2	Net Zero goal is set	2040	2045, 2050
3	Sustainability goals set with a clear path to achieving these goals	Passed if a clear path to achieving Net Zero goals is indicated. The operators are advised to follow the ITU-T industry standards L1470 [25] and L1471 [26]. The best assurance is if climate targets are verified by Science Based Targets Initiative (SBTi) or another competent third party [28].	
4	Target to reduce Scope 1 & 2 to near zero	2025	2030, 2035
5	Target amount of scope 3 emission reduction by 2030 (emission reduction compared to 2010 or	45% 22% if Scope 1 & 2 are near zero	30%

Table 2: Energy and Quality of Experience KPIs and their thresholds

	KPI Name	Target value Maximum threshold	Other thresholds
1	Quality-of-Experience (QoE) assessment	The top possible category or class, e.g., outstanding as in Figure 7. Corresponds to very high percentage of the points/values achievable	Other QoE classes
2	Energy and electricity consumption reported	Passed if both the energy and the electricity consumptions are reported	
3	Historical trend of network energy and/or electricity consumption	Decreasing	Stable
4	Power Usage Effectiveness (PUE) of data centres reported	KPI met if the company wide value is reported	

- **The industry should move towards using a unified methodology for all key sustainability KPIs**
  - Move towards using the Environmental and Energy & QoE KPIs in the report
- **Target Values defined – use them**
- **Consider reporting KPIs on a per-country level** (rather than group level)
- **Obtaining the right data is critical**
  - More granular (e.g. separate energy consumption for each part of the network)
  - Trust (accuracy / integrity)

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NETWORK ENERGY EFFICIENCY

NEW PUBLICATIONS OUT SOON

- Topics **further addressing energy efficiency of networks**
  - **Better engineering networks** (Radio units and antennas, DC Power Distribution, Cooling, Energy harvesting & renewable energy)
  - **Using network energy saving features** (standardised technology / sleep and power saving modes etc)
  - **Reviewing new technology enablers** (Reconfigurable Intelligent Surfaces, others)
- **Energy consumption of disaggregated networks**

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6G

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NGMN'S ROAD FROM 4G TO 6G

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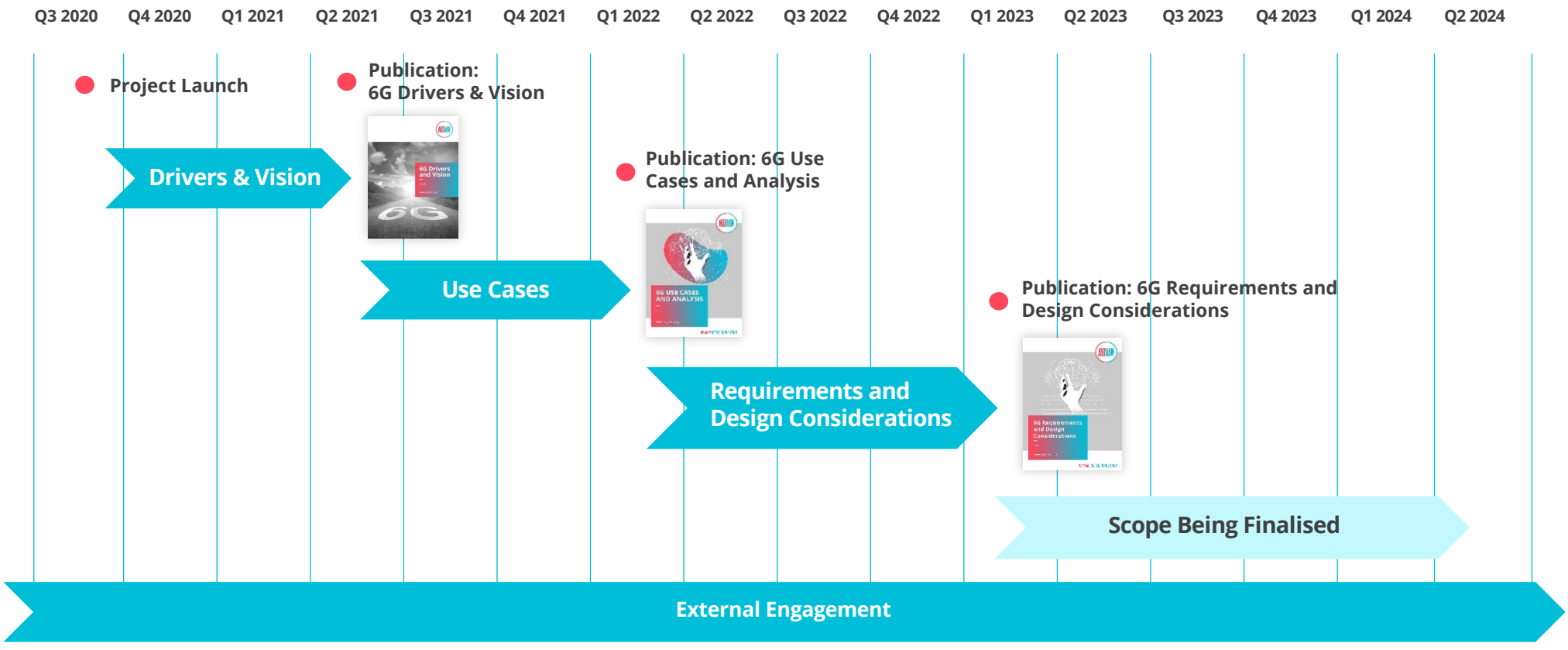
6G PROJECT MILESTONES



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NGMN 6G GENERIC USE CASES

ENHANCED HUMAN COMMUNICATION	ENHANCED MACHINE COMMUNICATION	ENABLING SERVICES	NETWORK EVOLUTION
XR immersive holographic telepresence communication	Robot Network Fabric	3D hyper-accurate positioning localization, and tracking	Trusted Native AI – AIaaS
Multi-modal communication for teleoperation	Interacting Cobots	Interactive mapping, digital twins & virtual worlds	Coverage expansion
Intelligent interaction: sharing of sensation, skills & thoughts		Automatic detection protection & inspection	Energy Efficiency
		Digital healthcare	
		Smart Industry	
		Trusted composition of services	

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6G REQUIREMENTS AND DESIGN CONSIDERATIONS

KEY MESSAGES

1. **Essential requirements** for network evolution and customer driven outcomes

2. **Any 6G system will be built upon the features and capabilities introduced with 5G**

3. **Design considerations** that consider economic, environmental, and technical trade-offs

4. **Fresh thinking** to address long standing challenges and limitations

5. **Key influences on 6G design:**
   - Supporting area capacity growth
   - Reducing network energy consumption
   - Delivering capabilities (speed, latency) aligned with customer need
   - Indoor vs Outdoor coverage

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THANK YOU

In case of further questions please contact
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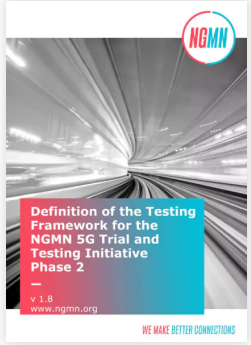
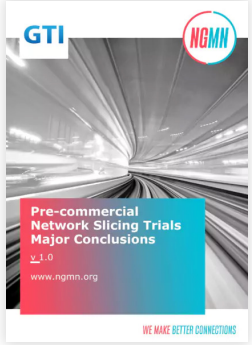
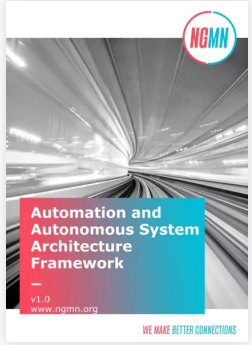
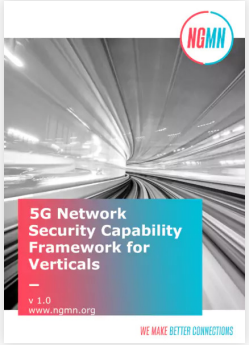
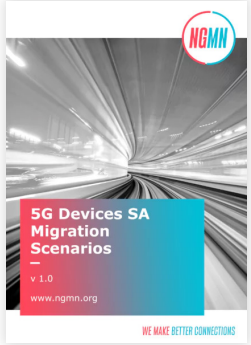
KEY DOCUMENTS PUBLISHED RECENTLY

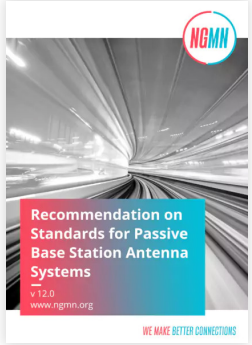


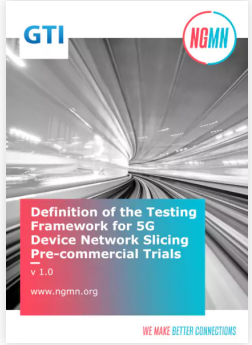


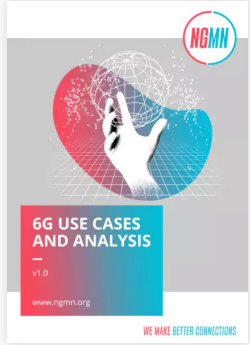












Results of our Work-Programme:
Internationally recognised requirements, recommendations and guidance to the industry and for standardisation

https://www.ngmn.org/publications.html

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