



5G Smart Devices Supporting Network Slicing

China Mobile

Why Network Slicing in 5G Smart Phones?

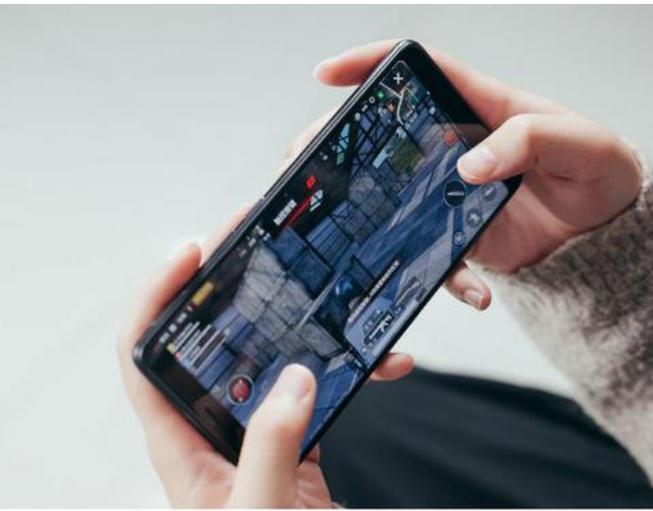
- 📶 **Network Slicing** is an important 5G feature/capability
 - to meet the different user demands for **large bandwidth, low latency, high reliability** and **strong isolation**
 - not only for 2B service, but also for **2B2C** service
 - to fulfill customers' personalized service experience demands, even on a APP specific level



HD Conf-call



Online Live Broadcasting



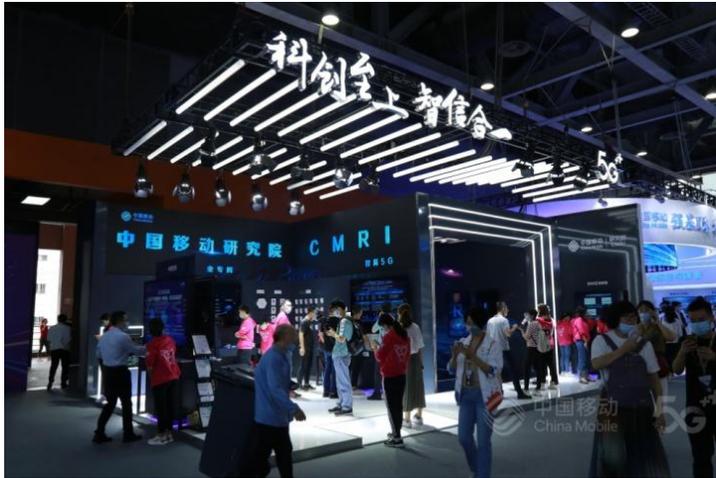
Online Video Game



Online Video Streaming

Demonstration: Online Speed Test

An **OVERLOADED** network was set up for the Slicing Demo
@ **2020 China Mobile Global Partner Conference** @ Guangzhou, Nov. 19~21, 2020



Slicing Enabled



Slicing **NOT** Enabled

Demonstration: Online Video “Inception”

An **OVERLOADED** network was set up for the Slicing Demo
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Slicing Enabled

Slicing **NOT** Enabled



For more videos, please visit:
<https://pan.baidu.com/s/1cVINAcDW6xxEnL444I4mNg>
Password: uu0d

Demonstration: Cloud Gaming “Arena of Valor”

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Slicing Enabled

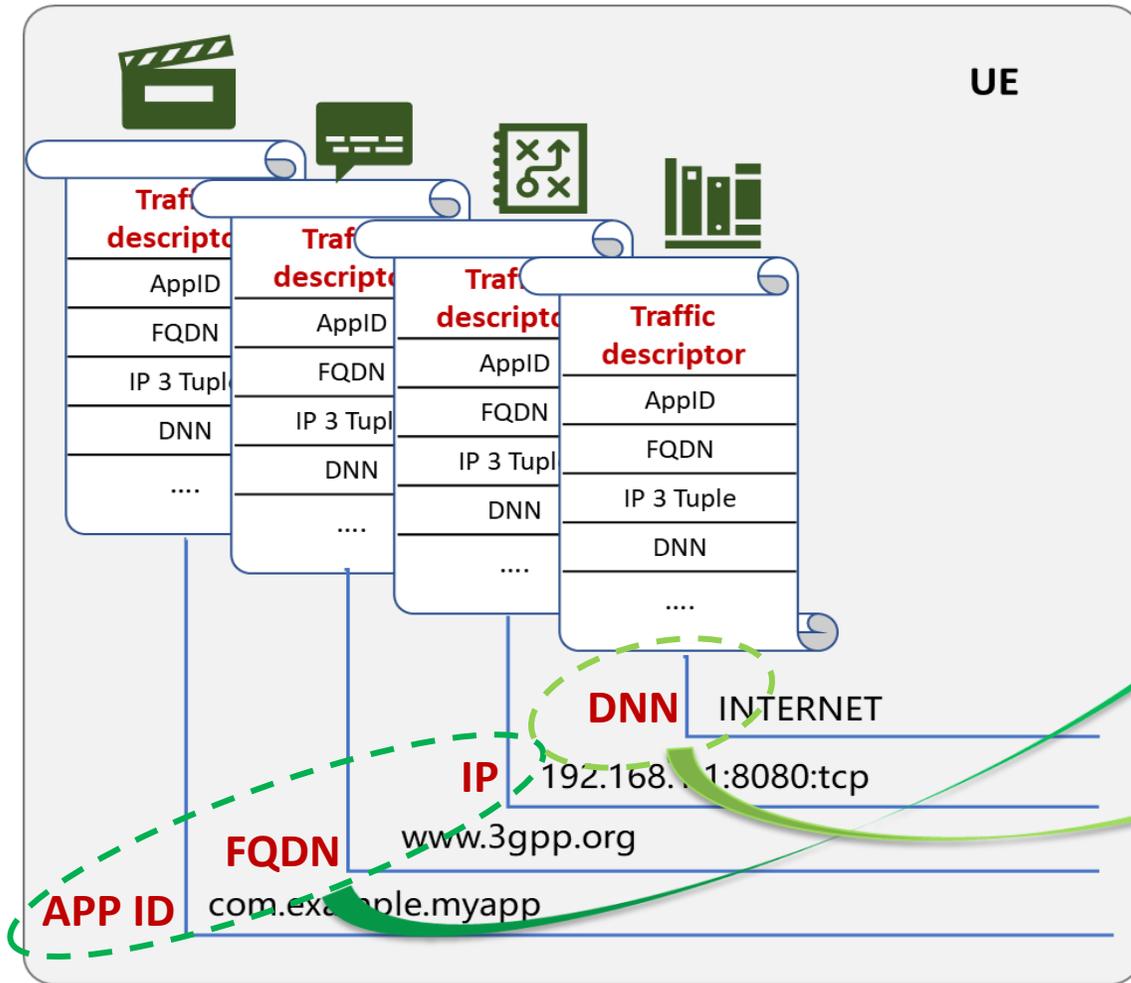


Slicing **NOT** Enabled



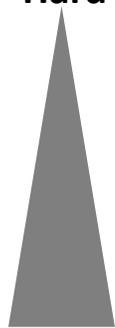
← RTT between Device and Cloud Gaming Server →

How to describe the attributes of Applications?



Traffic Descriptor (TD)

- To describe the key attributes of Applications
- To identify different Applications

	Granularity	Availability
Native Attributes (e.g. DNA, blood type) 	APP based (APP ID)	Hard 
	IP Based (FQDN, IP 3 Tuples)	
Given Attributes (e.g. Name, phone number) 	Connection Based (DNN)	Easy

- Most TD (e.g. APPID, FQDN, IP) can ONLY be obtained by OS
- The other TD (e.g. DNN) need to be enabled by OS

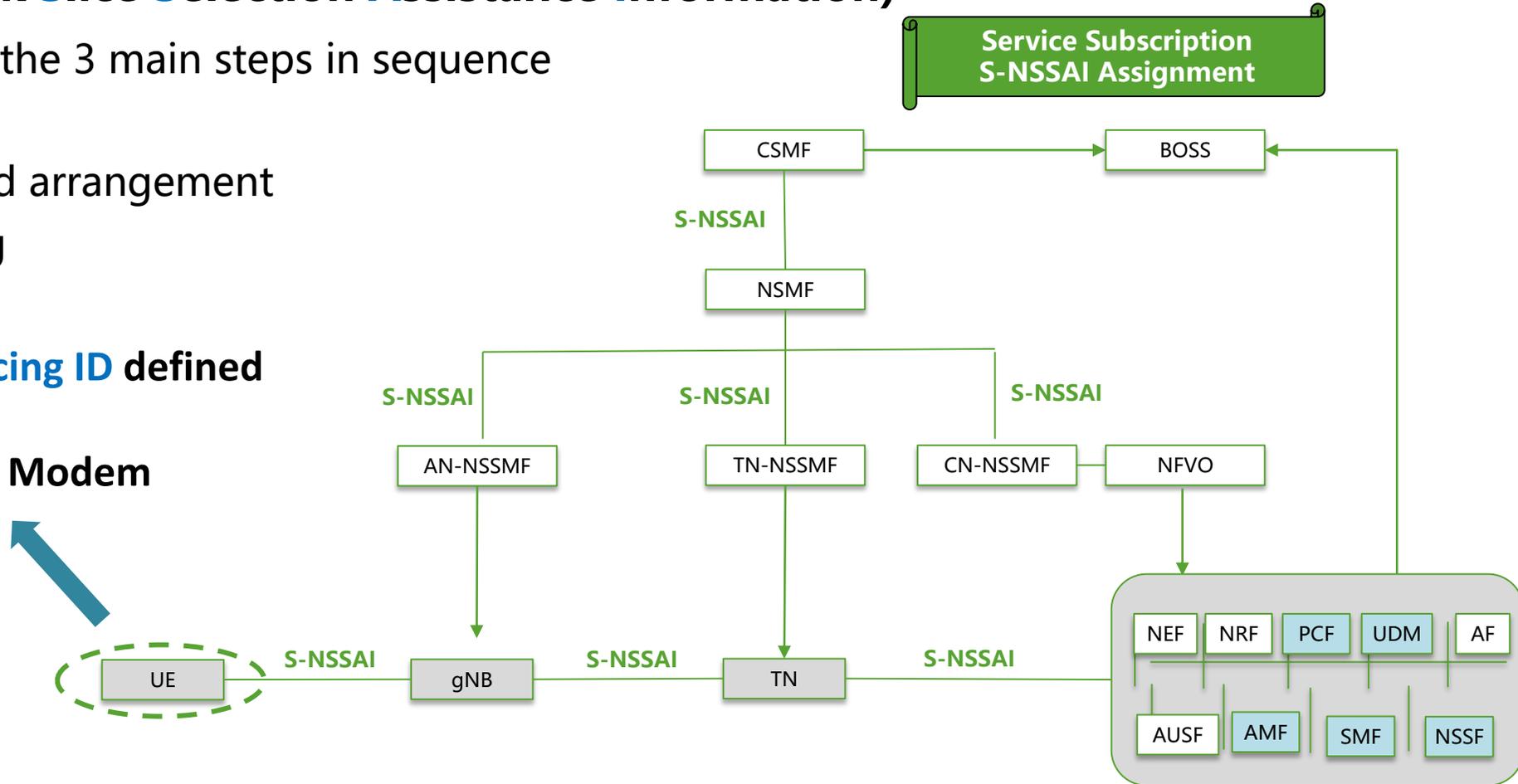
How to identify the **Network Slicing**?

S-NSSAI (Single Network Slice Selection Assistance Information)

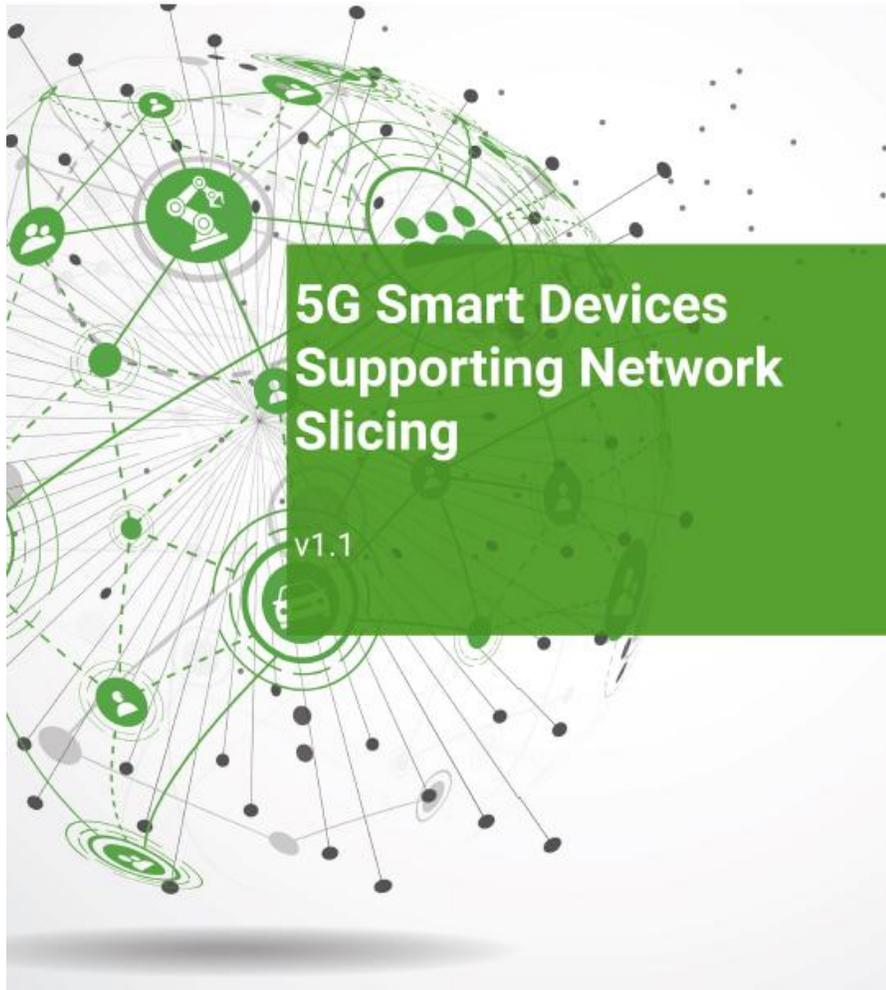
The "link" running through the 3 main steps in sequence

1. service subscription
2. slicing management and arrangement
3. slicing service providing

- ✓ **S-NSSAI is the Network Slicing ID defined in 3GPP**
- ✓ **S-NSSAI is implemented in Modem**

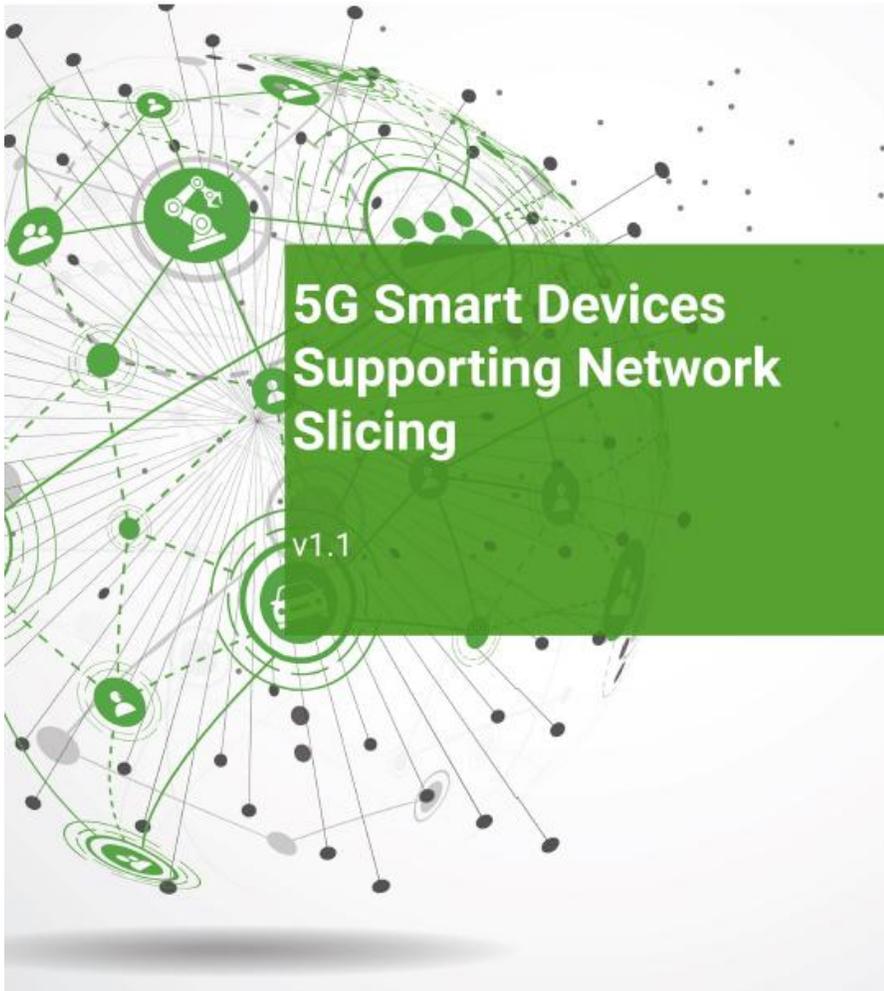


5G Smart Devices Supporting Network Slicing White Paper



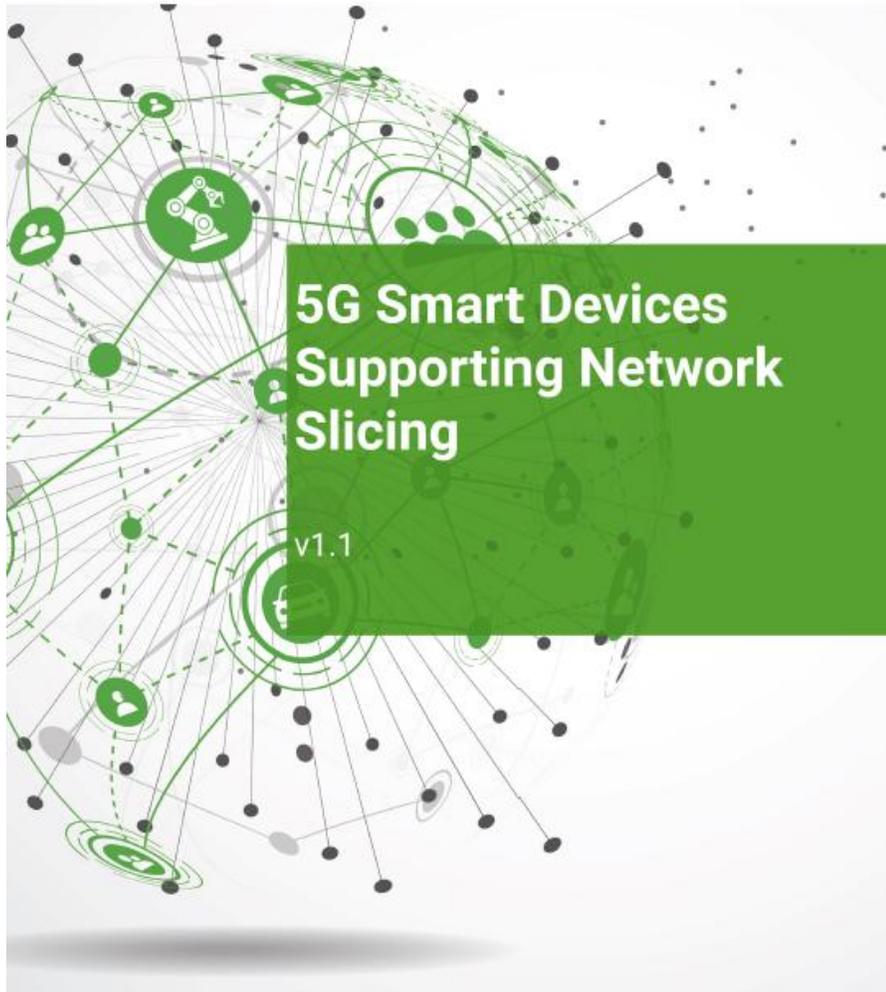
- 📶 **NGMN S-Project:** Network Slicing Requirements for Operating Systems of 5G Smart Phones
- 📶 **GTI - Task-T-PM2-PJ3-5:** GTI 5G Network Slicing Device
- 📶 NGMN and GTI jointly published white paper for the first time
 - 5G Smart Devices Supporting Network Slicing White Paper
- 📶 Aim to promote smart devices to support network slicing

18 Contributors from NGMN and GTI



- Anritsu
- Apple
- Bell
- Cisco
- CMCC
- DT
- Ericsson
- HKT
- HUAWEI
- Intel
- Orange
- Qualcomm
- PLDT/Smart Philippines
- TIM
- TMO US
- ZTE
- MTK
- UNISOC

Content Introduction of the Whitepaper (1/3)



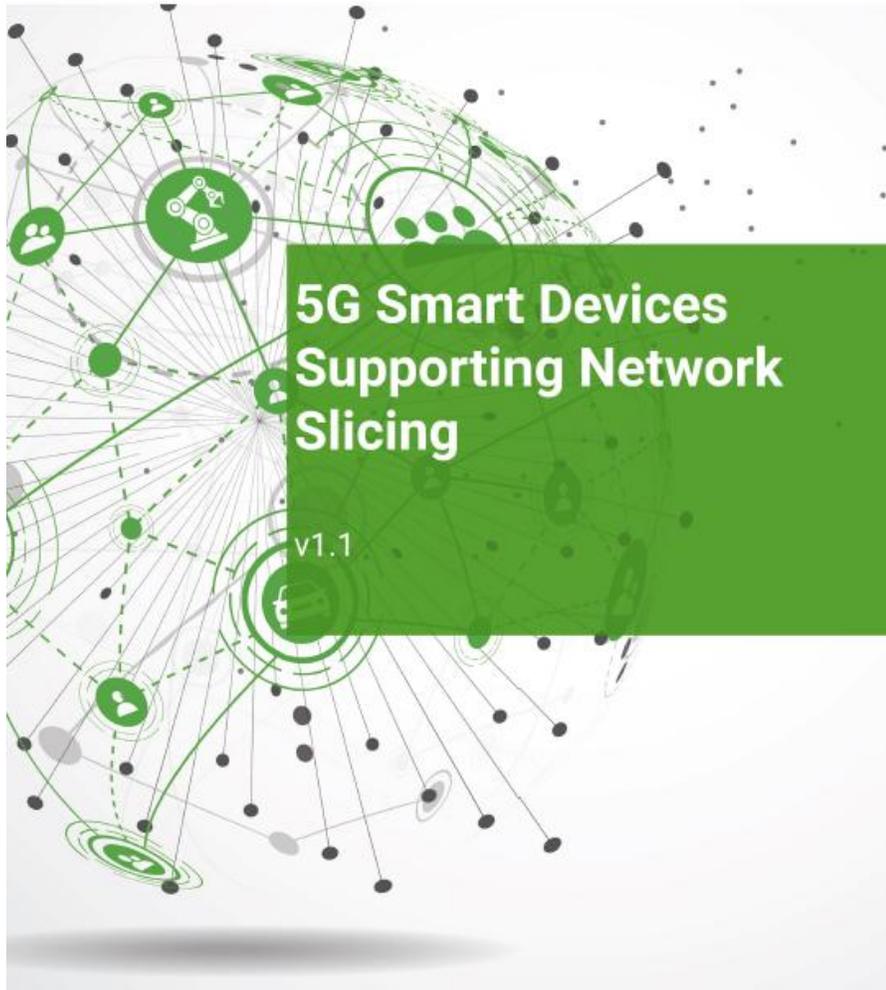
Service Capability of Network Slicing in 5G device

- Typical Use Cases and Scenarios
- Limitations of QoS Service Capabilities
- Advantages of Network Slicing Service Capabilities

Key Technologies and End-to-end Procedures of 5G Network Slicing

- Network Slicing Parameters (NSSAI, URSP, TD)
- Fundamental Functional Requirements for Network Slicing
- Protocol Signaling Procedure

Content Introduction of the Whitepaper (2/3)



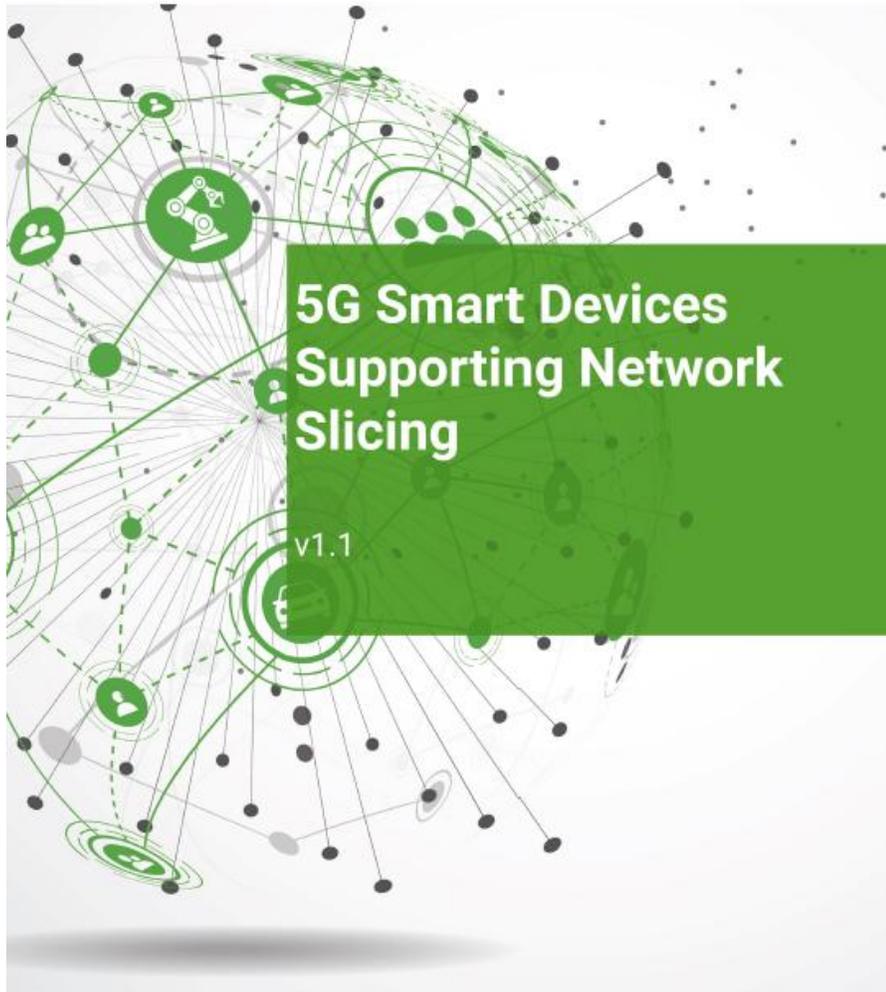
Challenges of the Implementation for 5G Network Slicing in Device

- Native Operating System Does Not Support URSP
- Potential Modification of the Applications
- Acquisition and Use of Traffic Descriptor

Reference Solution of Network Slicing in Device

- Network Slicing Solution based on APP ID
- Network Slicing Solution based on FQDN
- Network Slicing Solution based on IP 3 Tuples
- Network Slicing Solution based on DNN, including customized DNN

Content Introduction of the Whitepaper (3/3)



Test Requirements for 5G Network Slicing in Device

- Testing requirements
- Test coverage and existing capabilities
- Network Slicing test areas
- URSP test areas
- Application layer and Operating System
- Testing methodology
- Acquisition and Use of Traffic Descriptor

LS to RAN5 about 5G UE supporting Network Slicing

According to the just-released "5G Smart Devices Supporting Network Slicing White Paper", NGMN has drafted a Liaison Statement (LS) intended for 3GPP RAN5's reference.

From NGMN's point of view, user experience is critical for commercial success, and testing is the key guarantee. To enable testing the 5G smart devices supporting network slicing at an 'end to end' level requires the inclusion of application layer functions at the device side, as the slice selection and traffic routing procedures use application related selection criteria and mappings that are configured within the device. This application layer and device implementation specific functionality, e.g. UE policies for URSP, matching UE application to URSP, requesting suitable network slices, is currently outside of the scope being developed by 3GPP RAN5. Suitable test interfaces and test/verification procedures to support the implementation and inter-operability / consistency of network slicing for smart devices are required.

NGMN appreciates RAN5 to

Take this into consideration in the conformance test development planning. It will be highly appreciated if 3GPP RAN5 can define the test methods and test cases for application layer and device implementation specific functionality for 5G smart devices supporting network slicing.



Proposals

- **Proposal 1:** RAN5 to initiate a dedicated Study Item on how to define the test methods and test cases for application layer and device implementation specific functionality for 5G smart devices supporting network slicing
- **Proposal 2:** RAN5 to send reply-LS to NGMN about RAN5' s actions to NGMN' s requests in the LSin

5G



Thank You !

3GPP
A GLOBAL INITIATIVE