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# MAPS™ 5G N22 Interface Emulator

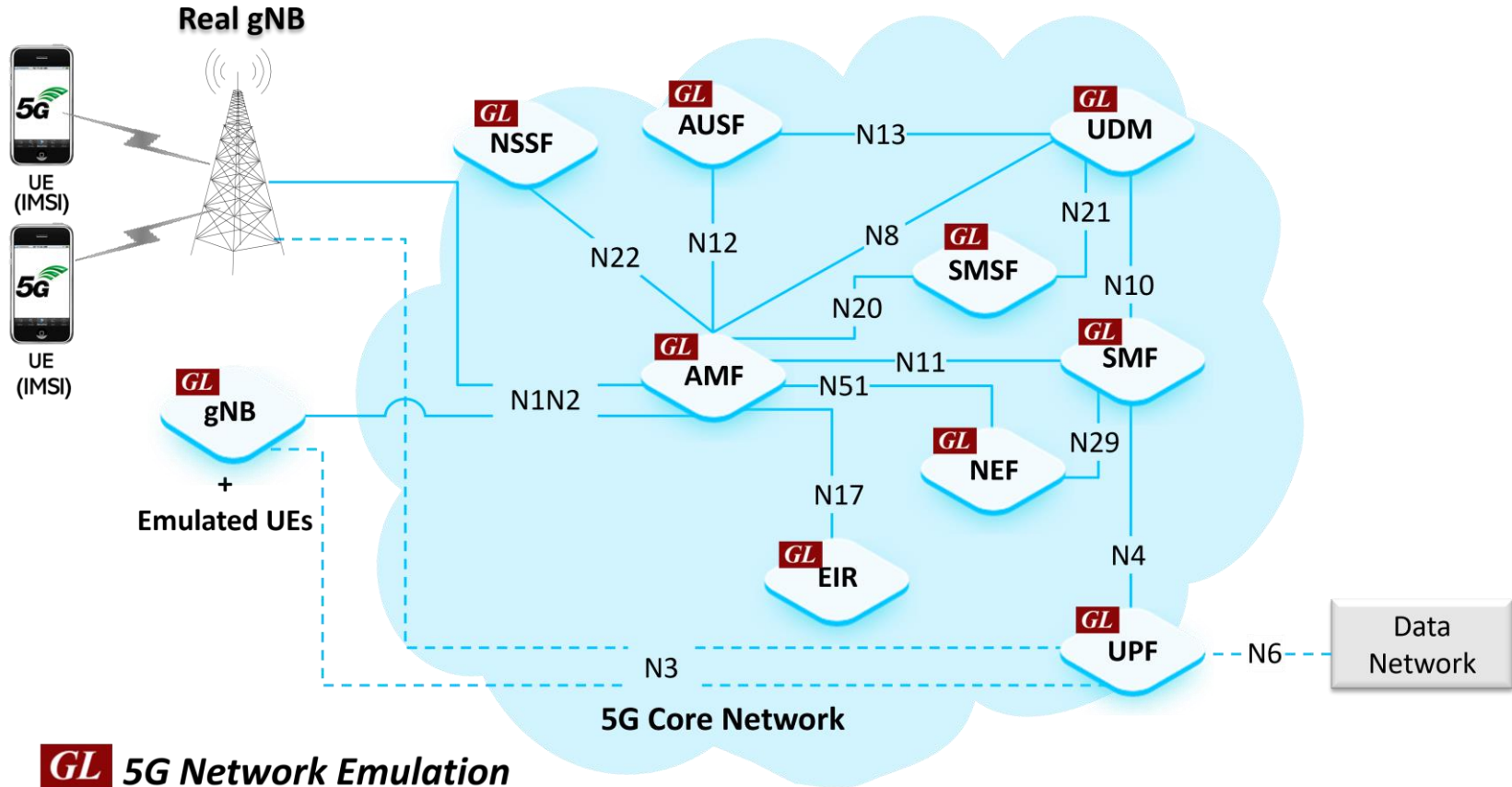
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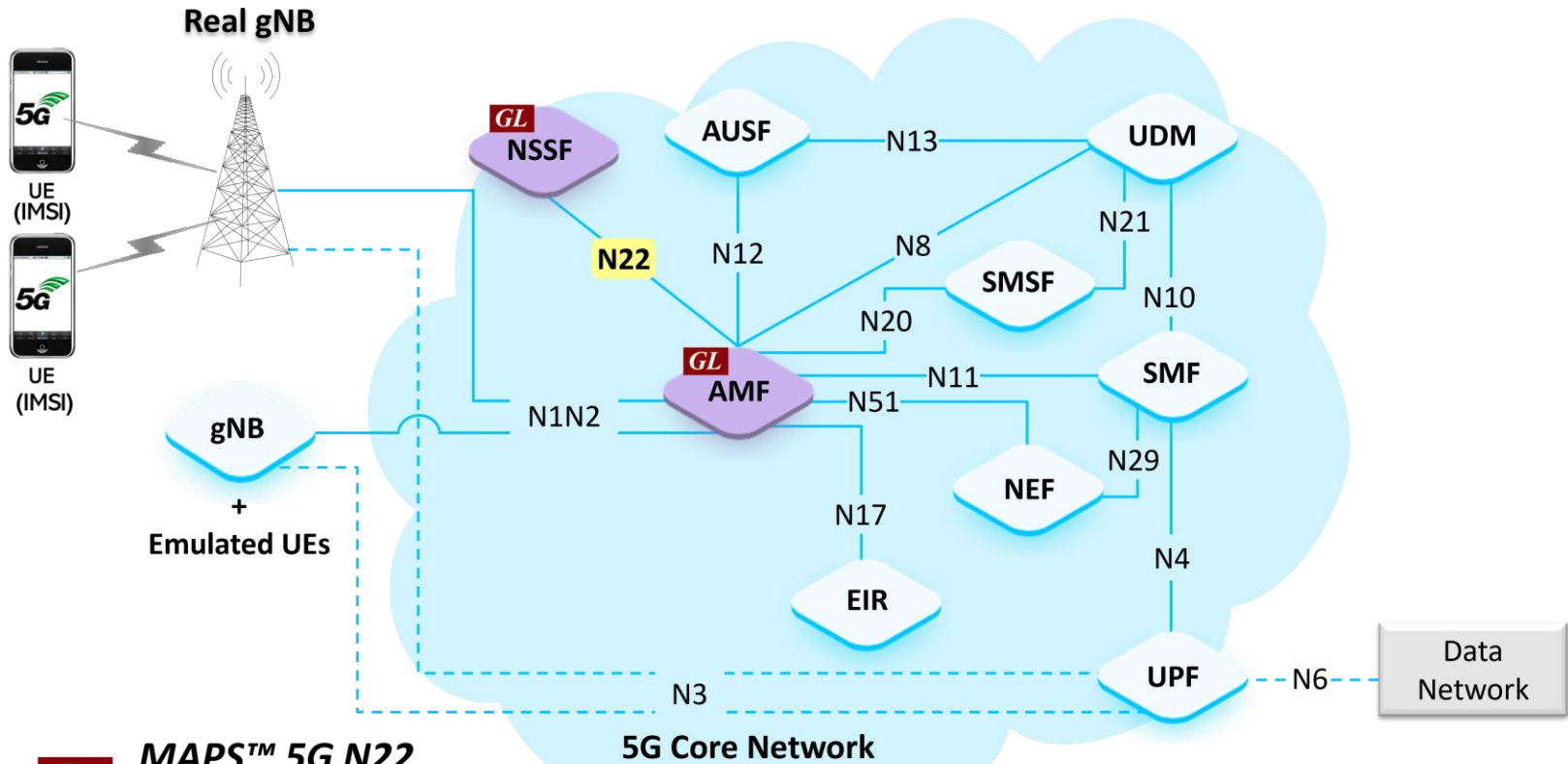
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# 5G Network Diagram



**GL** 5G Network Emulation

# MAPS™ 5G N22 Interface

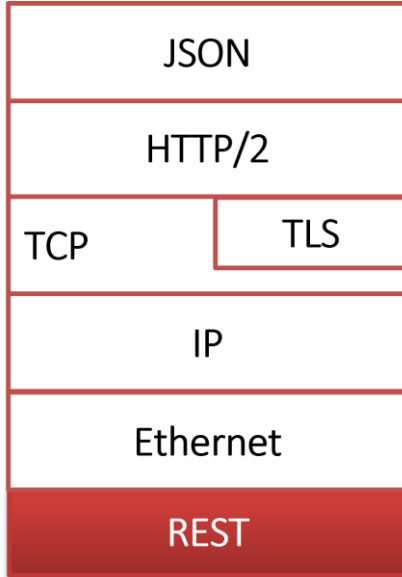


MAPS™ 5G N22  
Interface Emulator

# Main Features

- Emulate Access and Mobility Management Function (AMF) and Network Slice Selection Function (NSSF) elements
- Supports Nnssf\_NSSelection (Get service operation) and Nnssf\_NSSAIAvailability Service (Update, Subscribe, Unsubscribe, Notify and Delete service operations)
- Services use REST APIs based on HTTP and JSON data format
- Supports TLS and TCP transports
- Supports scripted call generation and automated call reception
- Supports customization of call flow and message templates using Script and Message Editor
- Ready-to-use scripts for quick testing
- Provides Call Statistics and Events Status

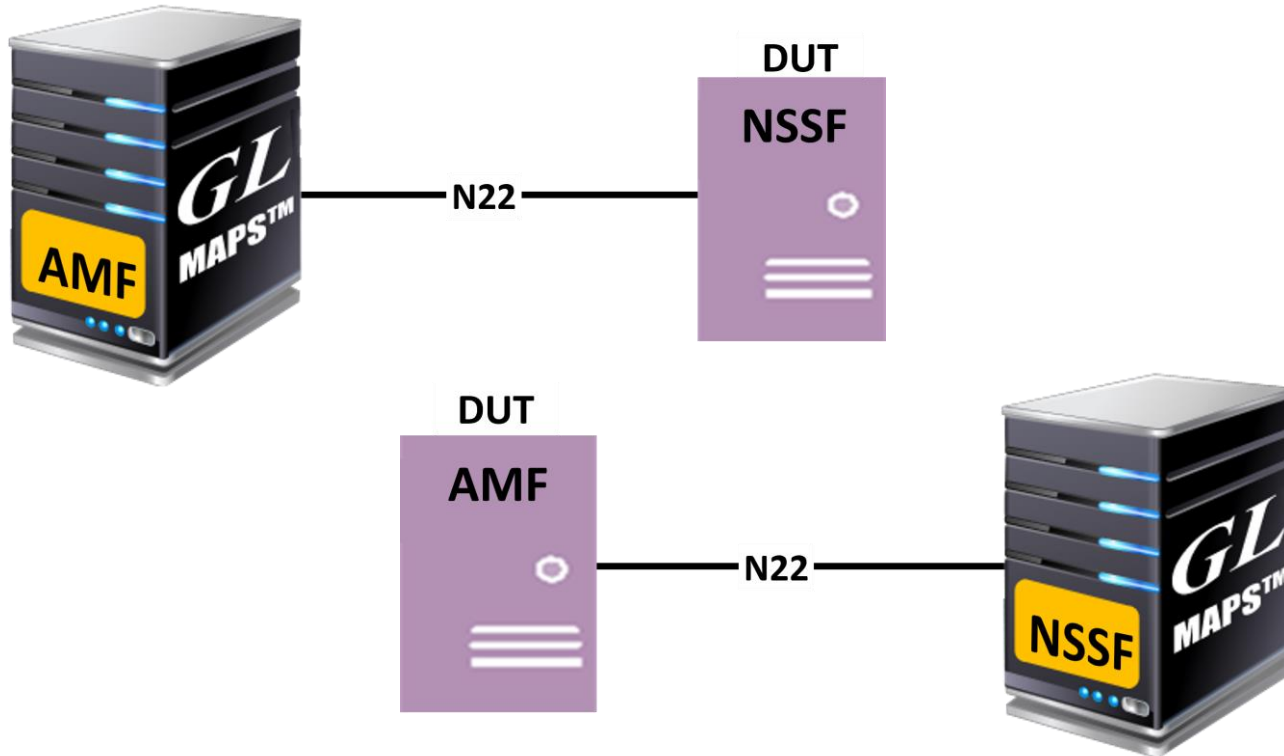
# Protocol Stack



Supported Protocols	Standard / Specification Used
<b>N22 Interface</b>	
N22 Interface (NSSF - AMF)	TS29.531 Release 17
JavaScript Object Notation (JSON)	IETF RFC 8259
HTTP / 2	IETF RFC 7231 IETF RFC 7540/RFC 7541
TLS	IETF RFC 8446
TCP	IETF RFC 793
IPv4	IETF RFC 791 [5] IETF RFC 2460 [6]

# User Cases

- MAPS™ can emulate any one node (AMF / NSSF) or both nodes



# Testbed Setup (AMF)

The screenshot displays the configuration interface for the MAPS AMF (N22 RELEASE15) software. The window title is "MAPS AMF (N22 RELEASE15) - [Testbed Setup -AMFDefault]". The interface includes a menu bar with "Configurations", "Emulator", "Reports", "Editor", "Debug Tools", "Windows", and "Help". Below the menu bar is a toolbar with various icons. The main area is a configuration tree with columns for "Config", "Value", and "Enable".

Config	Value	Enable
AMF N22 Configuration		<input checked="" type="checkbox"/>
AMF IP Address	192.168.12.195	
AMF Client Port	4444	
AMF Server Port	5555	
URI Scheme	HTTP	
AMF Name	GIAMF	
Served GUAMI List	1	
Served GUAMI List 1		
GUAMI		
PLMN Identity		
MCC	001	
MNC	01	
AMF Region Id	2	
AMF Set Id	3	
AMF Pointer	60	
Supported SNSSAI Availability Data	1	
Supported SNSSAI Availability Data 1		
PLMN Identity		
MCC	001	
MNC	01	
TAC	123	
Served SNSSAI	1	
Served SNSSAI 1		
SST	1	
SD	01	
Default SNSSAI Indication	True	
NSSF		
NSSF Configuration		
NSSF IP Address	192.168.12.219	
NSSF Server Port	6666	
NSSF API Versions		
NSSAI Availability Service	v1	
Network Slice Selection Service	v2	
End User Configuration	UE_Profiles.xml	

At the bottom of the configuration tree, there are "Start" and "Edit" buttons. The status bar at the bottom of the window shows "Initialisation Errors".

# Testbed Setup (NSSF)

The screenshot shows the 'MAPS NSSF (N22 RELEASE15) - [Testbed Setup -NSSFDefault]' window. The interface includes a menu bar with 'Configurations', 'Emulator', 'Reports', 'Editor', 'Debug Tools', 'Windows', and 'Help'. Below the menu is a toolbar with various icons. The main area is divided into a configuration table and a control panel.

Config	Value
<b>NSSF Configuration</b>	
NSSF IP Address	192.168.12.219
NSSF Port	6666
URI Scheme	HTTP
<b>NSSF API Versions</b>	
NSSF Availability Service	v1
NSSF Slice Selection Service	v2
AMF Configuration	AMF_Profiles.xml
Network Slice Selection Configuration	NSI_Profiles.xml

On the right side of the configuration table, there is a control panel with a checked checkbox labeled 'Enable'. Below this panel are 'Start' and 'Edit' buttons. At the bottom right of the window, there is a status bar with a red circle icon and the text 'Initialisation Errors'.



# Profile Editor (AMF)

MAPS AMF (N22 RELEASE15) - [Profile Editor -UE\_Profiles]

Configurations Emulator Reports Editor Debug Tools Windows Help

Profiles (Edit-F2)

#	Profiles (Edit-F2)	Config	Value	Enable
1	UEProfile0001	UEProfile0001		<input checked="" type="checkbox"/>
2	UEProfile0002	Simulate Roaming UE	True	
3	UEProfile0003	Roaming Indication	NON_ROAMING	
4	UEProfile0004	UE HPLMN		
5	UEProfile0005	MCC	100	
6	UEProfile0006	MNC	10	
7	UEProfile0007	UE TAI		
8	UEProfile0008	PLMNID		
9	UEProfile0009	MCC	100	
10	UEProfile0010	MNC	10	
		TAC	123	
		Subscribed SNSSAI	1	
		Subscribed SNSSAI 1		
		SST	1	
		SD	01	
		DefaultIndication	True	
		Home SNSSAI		
		SST	1	
		SD	01	
		Requested SNSSAI for Registration		
		SST	1	
		SD	04	
		Requested SNSSAI for PDU Session		
		SST	1	
		SD	01	

Insert Delete Clear

Add Insert Delete

Properties

Initialisation Errors Error Events

# Profile Editor (NSSF)

The screenshot displays the MAPS NSSF (N22 RELEASE15) Profile Editor window. The interface includes a menu bar (Configurations, Emulator, Reports, Editor, Debug Tools, Windows, Help), a toolbar, and a main configuration area. The configuration is organized into a tree view under 'AMF Profiles'.

#	Profiles (Edit-F2)	Config	Value	Enable
1	AMF Profiles	AMF Profiles	3	<input checked="" type="checkbox"/>
		AMF Profiles 1		
		AMF Name	GLAMF01	
		AMF Instance Id	ead1931b-4330-45da-8cc9-fd8c4311c...	
		AMF Region Id	2	
		AMF Set Id	23	
		AMF Pointer	60	
		TAC	123	
		PLMN Id		
		MCC	001	
		MNC	01	
		Served SNSSAI	2	
		Served SNSSAI 1		
		SST	1	
		SD	01	
		Default SNSSAI Indication	True	
		Served SNSSAI 2		
		SST	1	
		SD	02	
		Default SNSSAI Indication	False	
		Associated NSI Name	GLNSI01	
		AMF Profiles 2		
		AMF Name	GLAMF02	
		AMF Instance Id	ead1931b-4330-45da-8cc9-fd8c4311c...	
		AMF Region Id	2	
		AMF Set Id	23	
		AMF Pointer	61	
		TAC	1234	
		PLMN Id		
		MCC	001	
		MNC	01	
		Served SNSSAI	2	
		Served SNSSAI 1		
		SST	1	
		SD	03	
		Default SNSSAI Indication	True	
		Served SNSSAI 2		
		SST	1	
		SD	04	
		Default SNSSAI Indication	False	
		Associated NSI Name	GLNSI01	
		AMF Profiles 3		
		AMF Name	GLAMF03	

At the bottom of the configuration area, there are buttons for 'Add', 'Insert', and 'Delete', and a 'Properties' button. The status bar at the very bottom shows 'Initialisation Errors', 'Error Events', and 'Captured Errors'.

# Call Generation

MAPS AMF (N22 RELEASE15) - [Call Generation - CallGenDefault]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Result	Total Iterations	Completed Iteratio
1	Nnssf_AMF_NSSelection_Get_Request_Registration.gls	UEProfile0001	0f87850d-b35f-4a8f-a...	Start	Slice Selected for Registration	None	Pass	1	1
2	Nnssf_AMF_NSSelection_Get_Request_PDUSession.gls	UEProfile0001		Start		None	Unknown	1	0
3	Nnssf_AMF_NSSAIAvailabilityPut_Request.gls	UEProfile0001		Start		None	Unknown	1	0

Add Delete Insert Refresh Start Start All Stop Stop All Abort Abort All

Save Column Width Show Latest

MAPS DUT

GET /nssf-nselection/v2/network-slice-information 17:18:16.946000

200 OK 17:18:17.021000

Find

```
GET http://192.168.1.20:6666/nnssf-nselection/v2/network-slice-information?
"mcc": "10",
"mnc": "100"
}&nf-Id=0f87850d-b35f-4a8f-a429-5be1e9931248&nf-type=AMF&requestedNssai={
"sd": "04",
"sst": 1
}&slice-info-request-for-registration={
"subscribedNssai": [{
"defaultIndication": true,
"subscribedSnsai": {
"sd": "01",
"sst": 1
}
}]
}
accept : application/json,
application/problem+json
```

Scripts Message Sequence Event Config Script Flow

Initialisation Errors Error Events Captured Errors Link Status Up=0/1

# Call Reception

The screenshot displays the MAPS NSSF (N22 RELEASE15) - [Call Reception] application window. The interface includes a menu bar (Configurations, Emulator, Reports, Editor, Debug Tools, Windows, Help) and a toolbar with various icons. A table at the top shows the execution status of a script.

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Results
1	Nnssf_NSS_Control.gls		0f87850d-b35f-4a8f-a429-5be1e993...	Completed	Slice Requested for Registration Successful	None	Pass

Below the table, there are control buttons: Stop, Stop All, Abort, Abort All, Show Records (checked), Select Active Call, Auto Trash, Trash, and Show Hidden Calls. A 'Save' button and a 'Column Width' slider are also present.

The main area shows a message sequence diagram between DUT and MAPS. A GET request is shown from DUT to MAPS at 17:18:17.007000, and a response is received at 17:18:17.013000 with a status of 200.

On the right, the details of the message are displayed:

```
Status: 0
:method : GET
:path : /nnssf-nssselection/v2/network-slice-information
:scheme : http
:authority : 192.168.1.20:6666
accept : application/json,
application/problem+json
```

At the bottom, there are tabs for Scripts, Message Sequence (selected), Event Config, and Script Flow. A status bar at the very bottom shows 'Initialisation Errors', 'Error Events', and 'Captured Errors'.

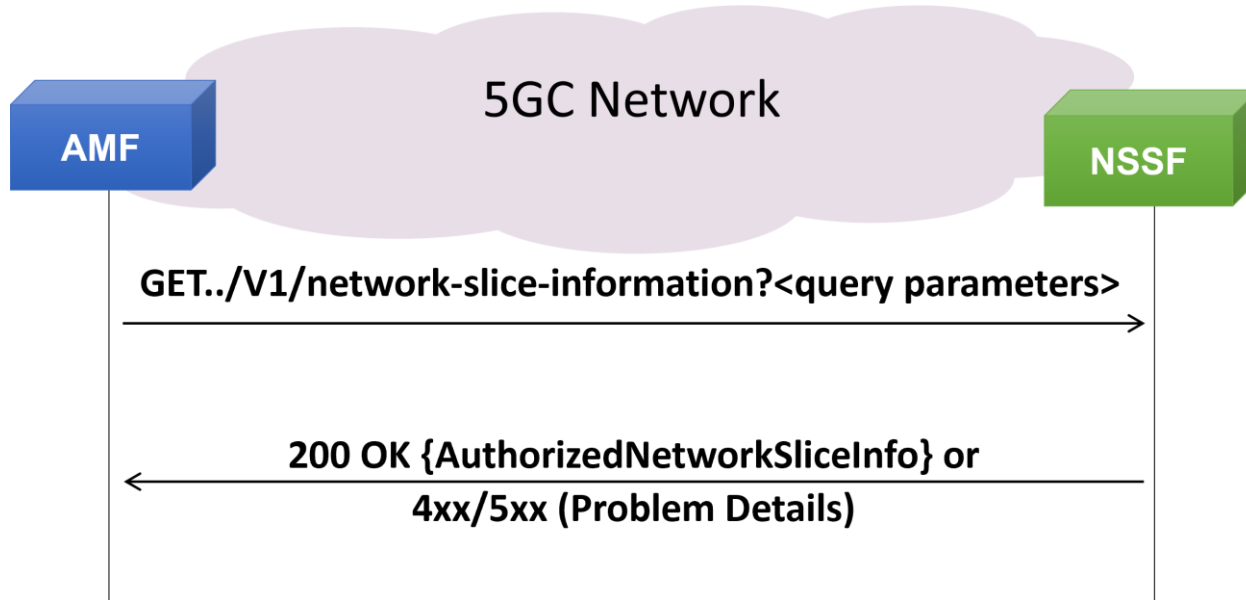
# MAPS™ 5G N22 Interface Procedures

- **Nnssf\_NSSelection Service**
  - Get service operation
- **Nnssf\_NSSAIAvailability Service**
  - Update Service Operation
  - Subscribe Service Operation
  - Unsubscribe Service Operation
  - Notify Service Operation
  - Delete Service Operation

# MAPS™ 5G N22 Interface Procedures

## Nnssf\_NSSelection Service

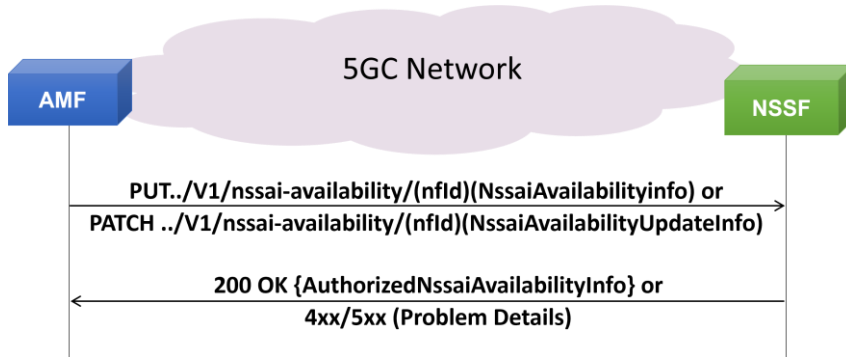
Get service operation



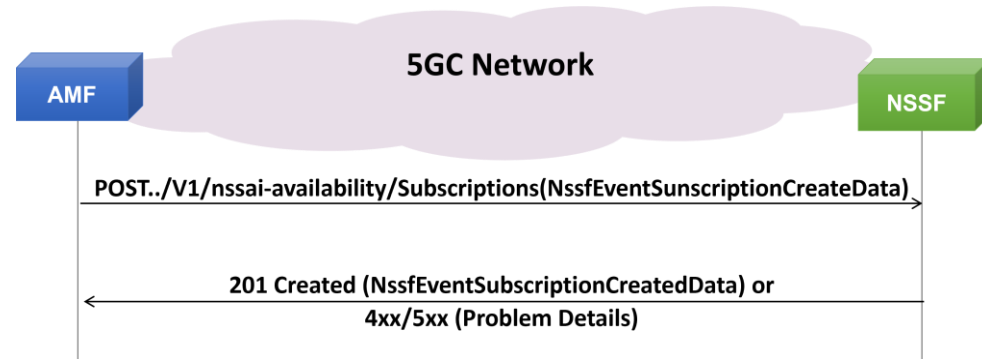
# MAPS™ 5G N22 Interface Procedures (Contd.)

## Nssf\_NSSAIAvailability Service

### Update Service Operation



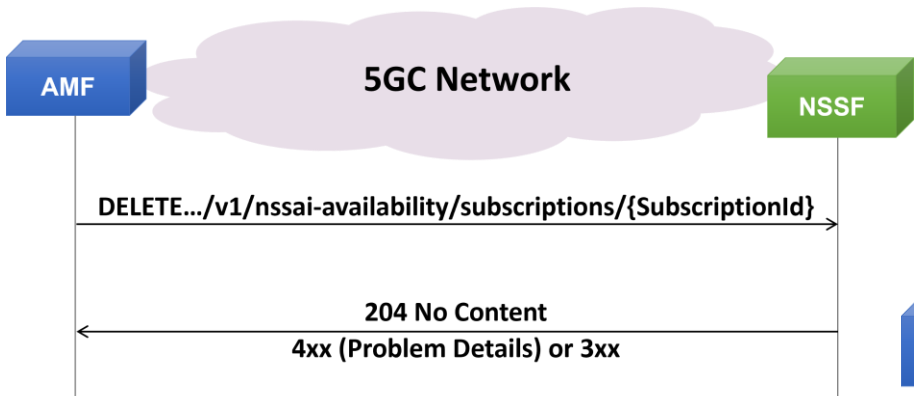
### Subscribe Service Operation



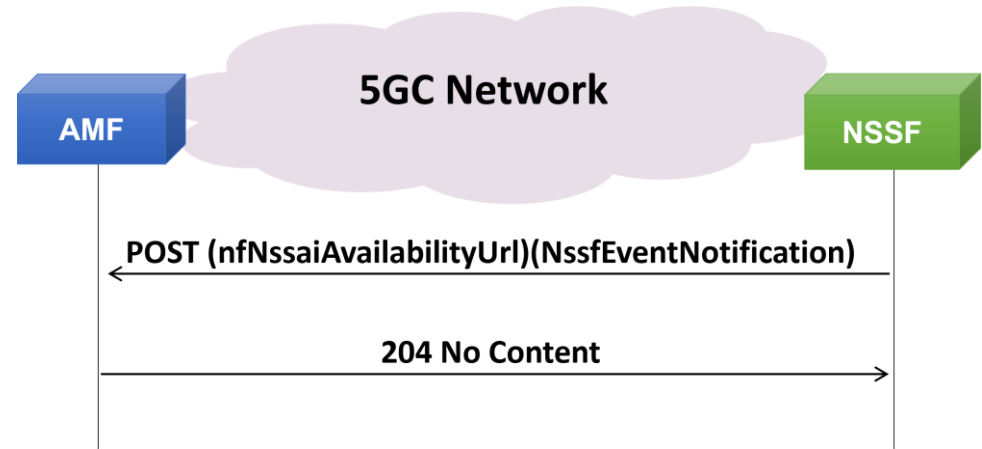
# MAPS™ 5G N22 Interface Procedures (Contd.)

## Nssf\_NSSAIAvailability Service

### Unsubscribe Service Operation



### Notify Service Operation

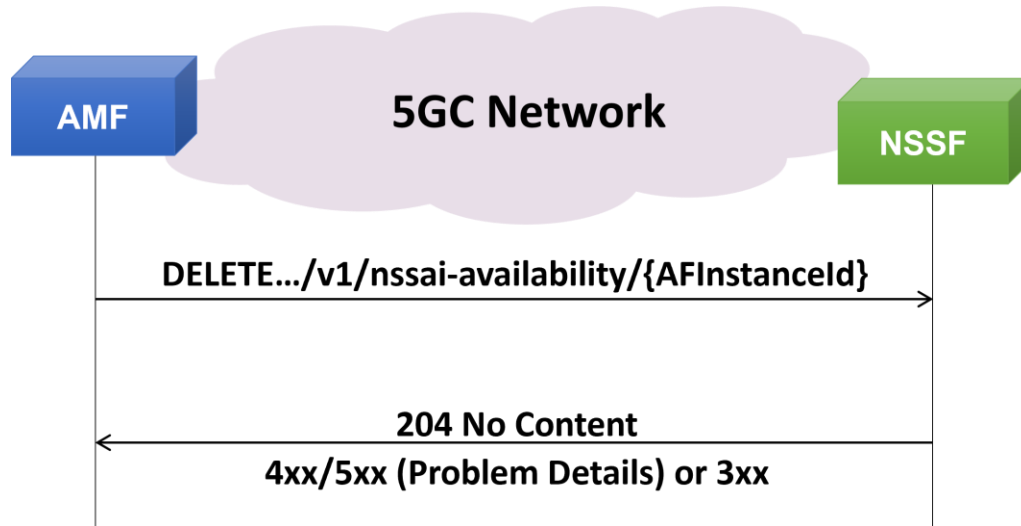




# MAPS™ 5G N22 Interface Procedures (Contd.)

## Nssf\_NSSAIAvailability Service

### Delete Service Operation



**Thank you**