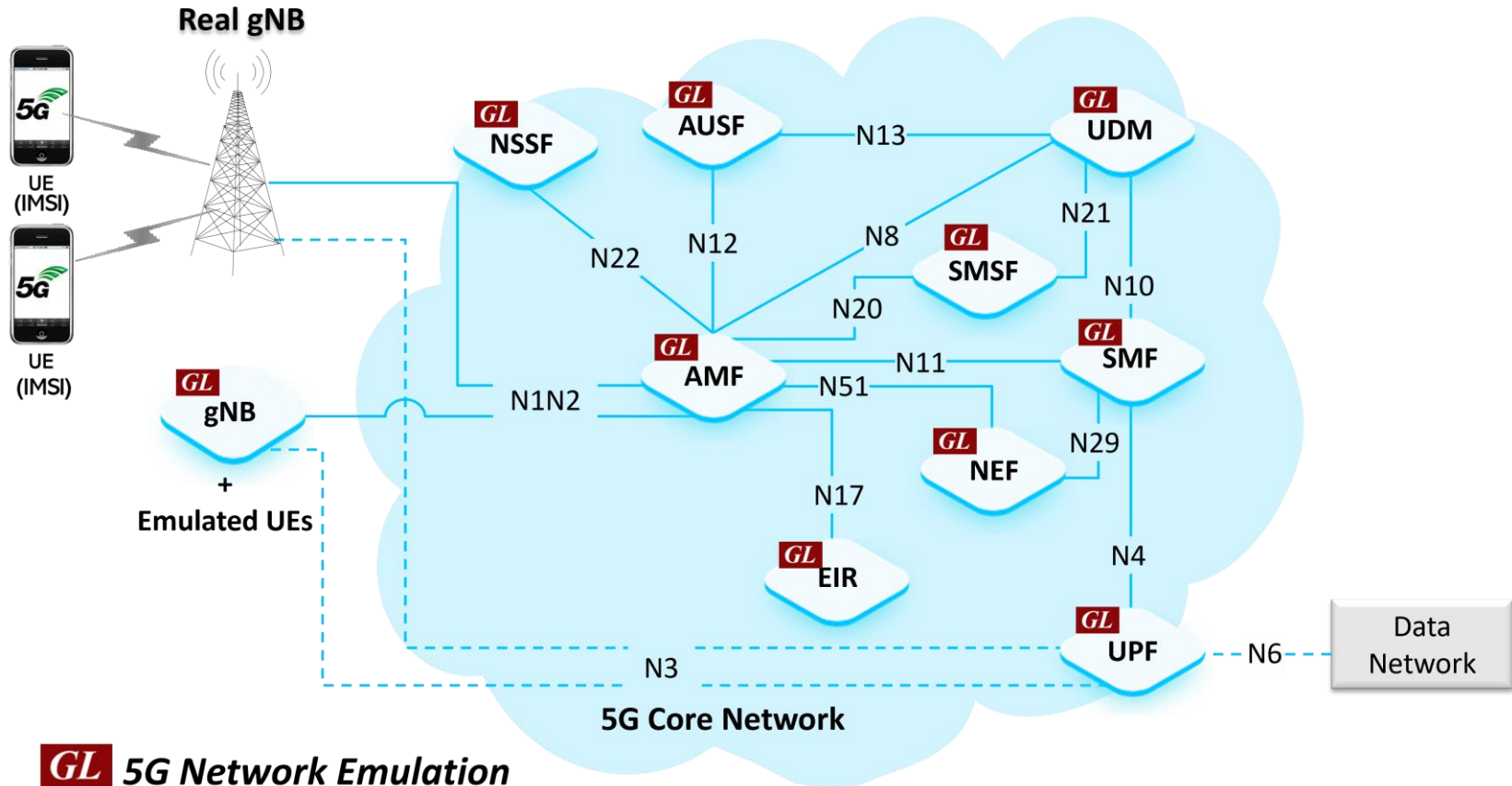

MAPS™ 5G N22 Interface Emulator



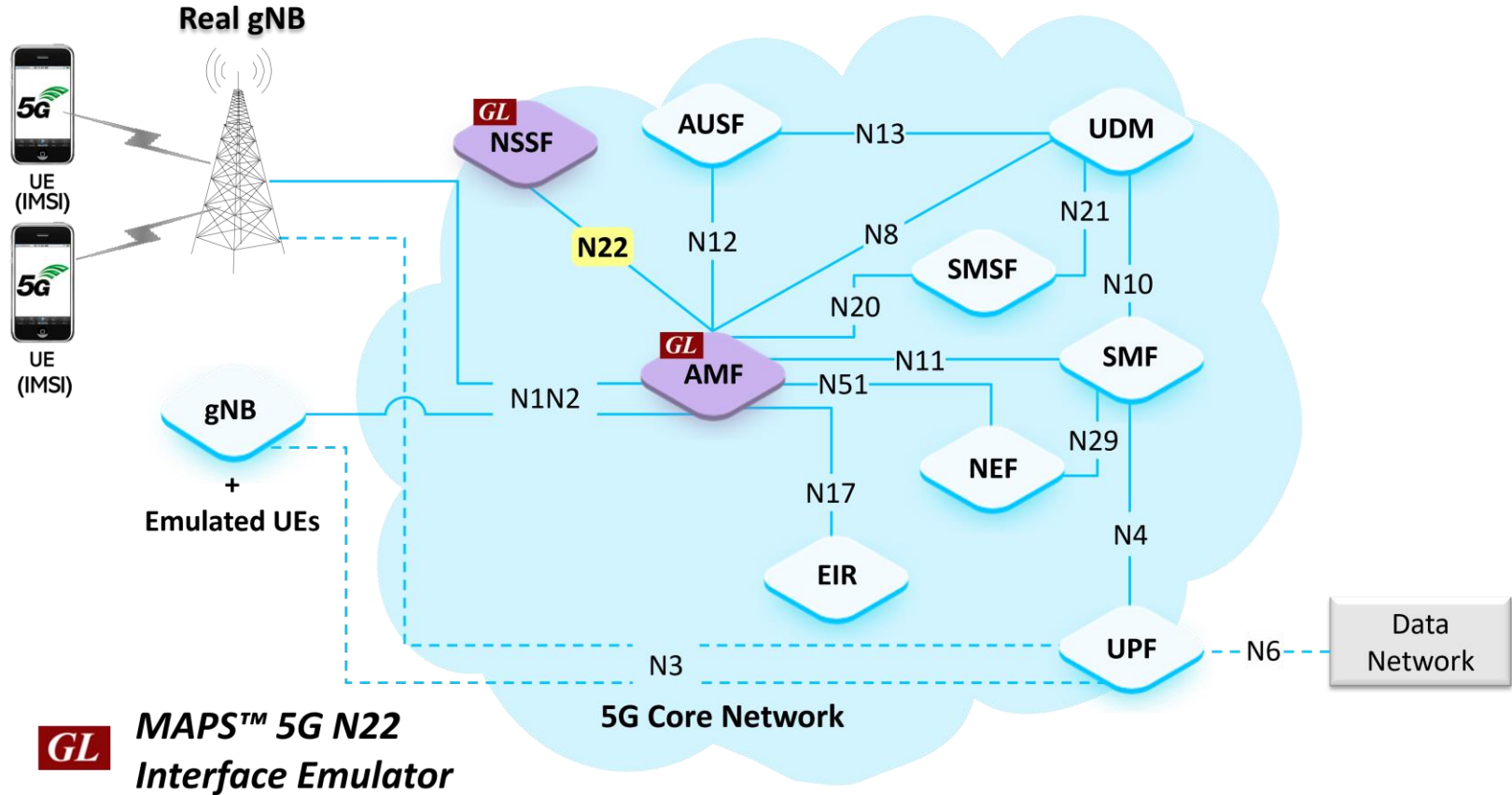
818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878
Phone: (301) 670-4784 Fax: (301) 670-9187 Email: info@gl.com
Website: <https://www.gl.com>

5G Network Diagram



GL 5G Network Emulation

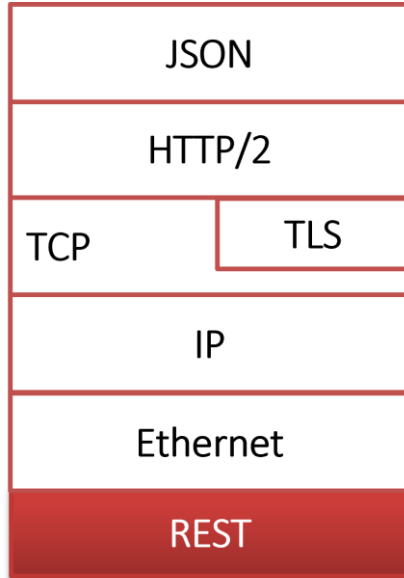
MAPS™ 5G N22 Interface



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

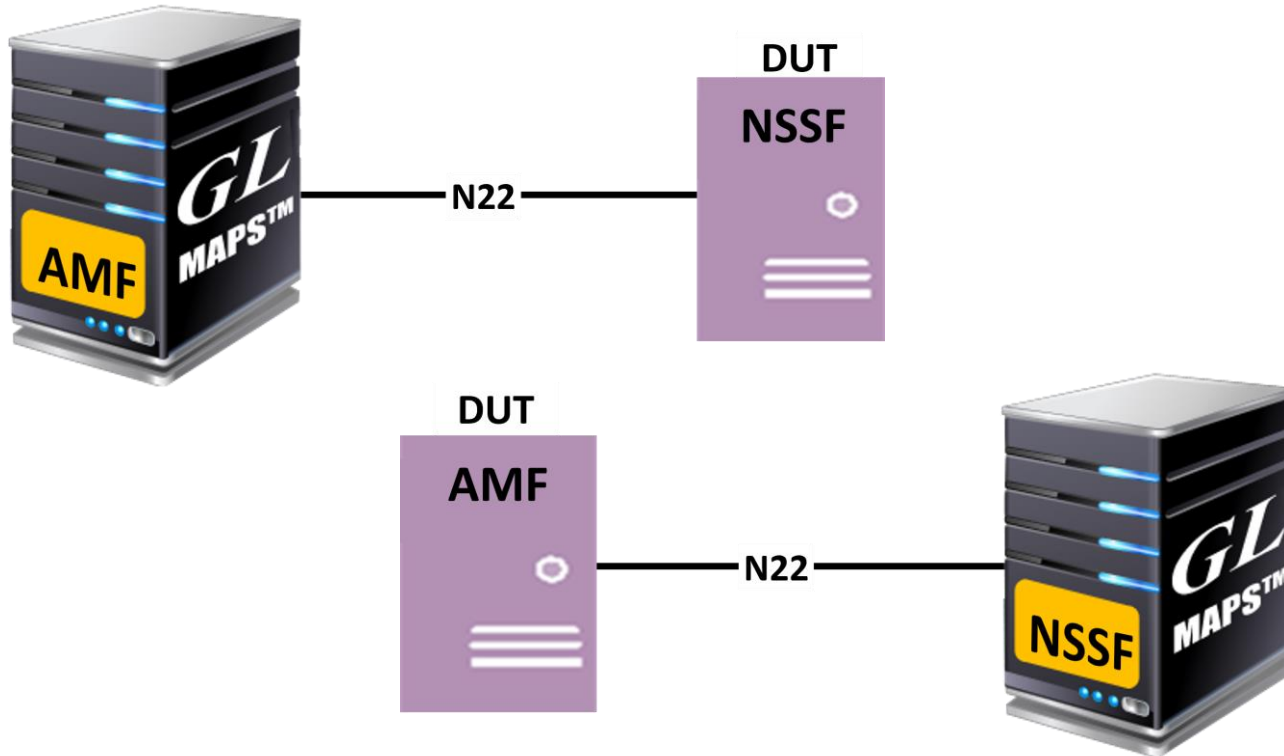
Protocol Stack



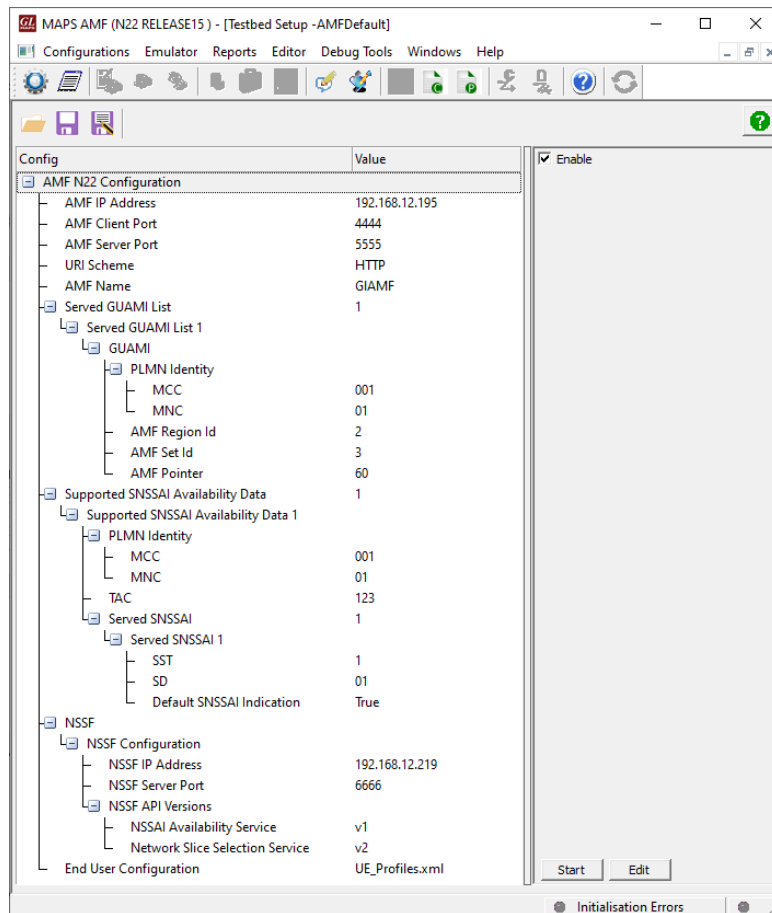
Supported Protocols	Standard / Specification Used
N22 Interface	
N22 Interface (NSSF - AMF)	TS29.531 Release 17
JavaScript Object Notation (JSON)	IETF RFC 8259
HTTP / 2	IETF RFC 7231 IETF RFC 7540/RFC 7541
TLS	IETF RFC 8446
TCP	IETF RFC 793
IPv4	IETF RFC 791 [5] IETF RFC 2460 [6]

User Cases

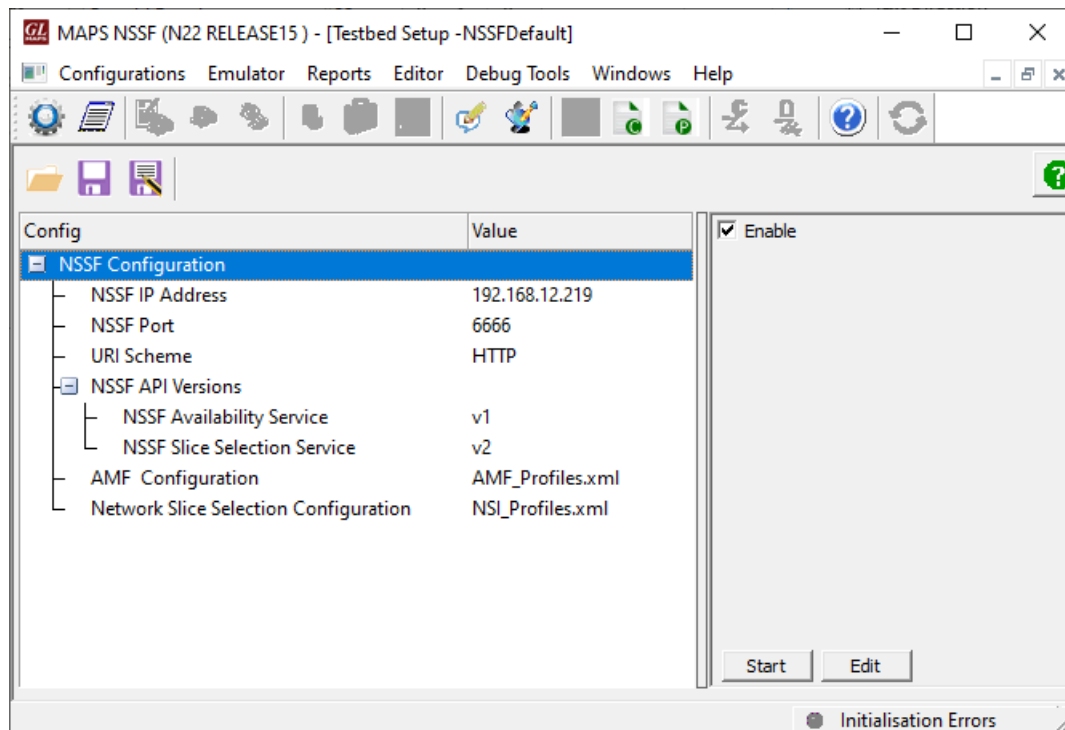
- MAPS™ can emulate any one node (AMF / NSSF) or both nodes



Testbed Setup (AMF)



Testbed Setup (NSSF)



Profile Editor (AMF)

MAPS AMF (N22 RELEASE15) - [Profile Editor - UE_Profiles]

Configurations Emulator Reports Editor Debug Tools Windows Help

Profiles (Edit-F2)

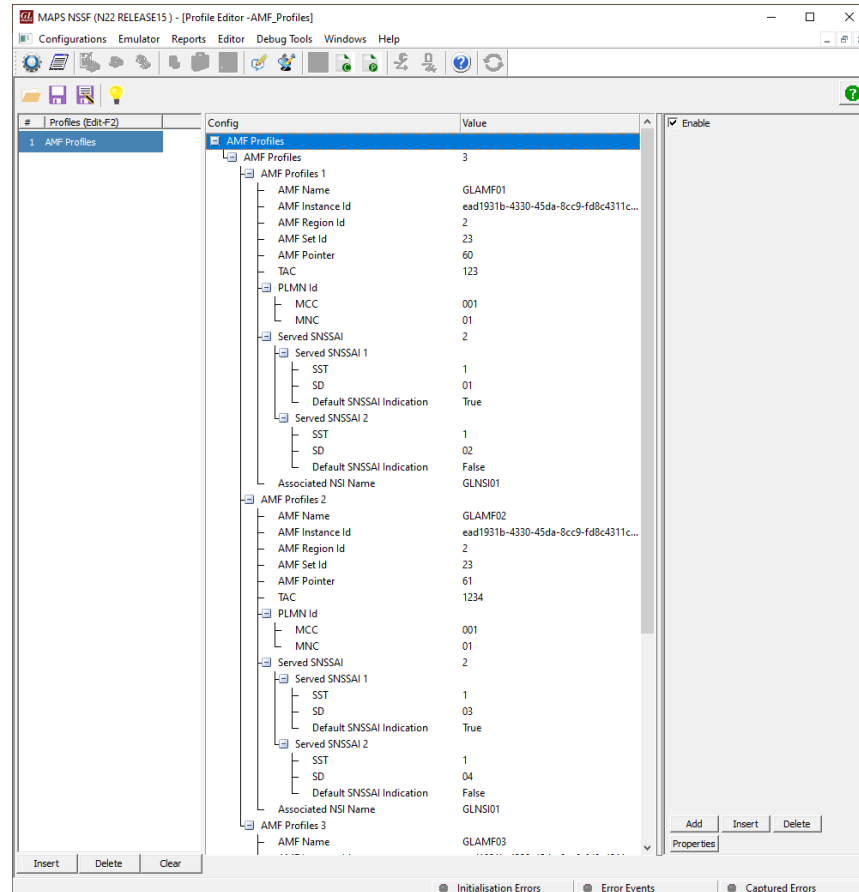
#	Profiles (Edit-F2)	Config	Value	Enable
1	UEProfile0001	UEProfile0001		☒
2	UEProfile0002	Simulate Roaming UE	True	
3	UEProfile0003	Roaming Indication	NON_ROAMING	
4	UEProfile0004	UE HPLMN		
5	UEProfile0005	MCC	100	
6	UEProfile0006	MNC	10	
7	UEProfile0007	UE TAI		
8	UEProfile0008	PLMNID		
9	UEProfile0009	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)



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 Iteration
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 /nnssf-nssselection/v2/network-slice-information 17:18:16.946000

200 OK 17:18:17.021000

Find

```
GET http://192.168.1.20:6666/nnssf-nssselection/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,
"subscribedSnnssai": {
"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

Call Reception

GL MAPS NSSF (N22 RELEASE15) - [Call Reception]

Configurations Emulator Reports Editor Debug Tools Windows Help

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

Stop Stop All Abort Abort All ☒ Show Records ☐ Select Active Call ☐ Auto Trash Trash ☐ Show Hidden Calls

Save Column Width ☐ Show Latest

DUT MAPS

GET /nnssf-nssselection/v2/network-slice-information 17:18:17.007000

200 17:18:17.013000

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

Scripts **Message Sequence** Event Config Script Flow

Initialisation Errors Error Events Captured Errors

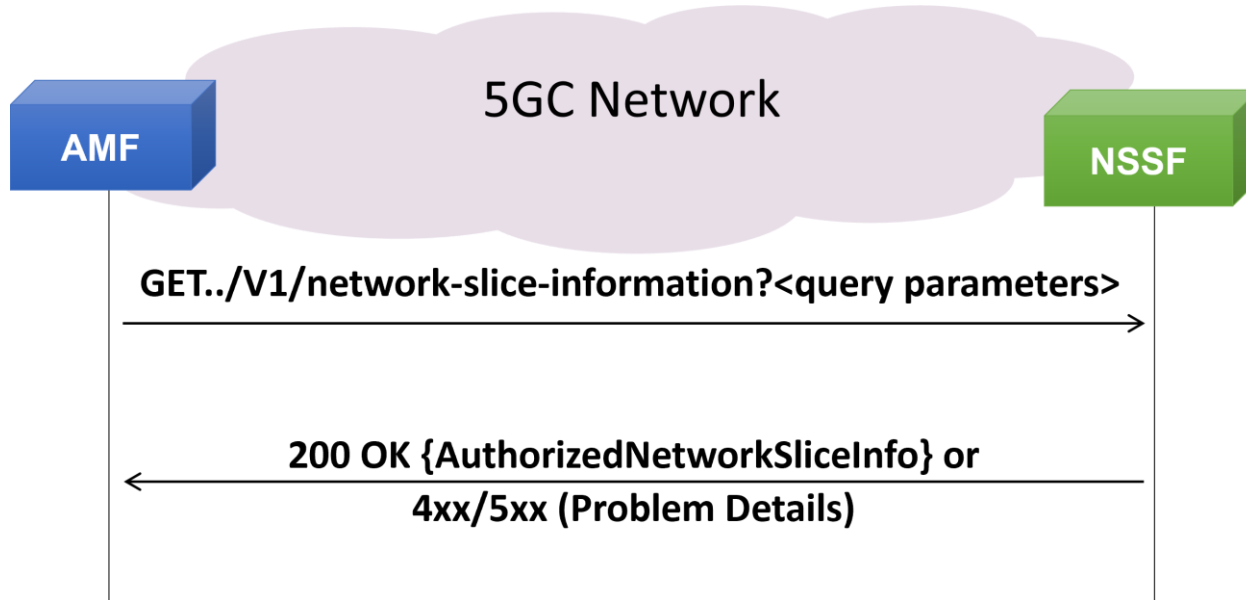
MAPS™ 5G N22 Interface Procedures

- **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

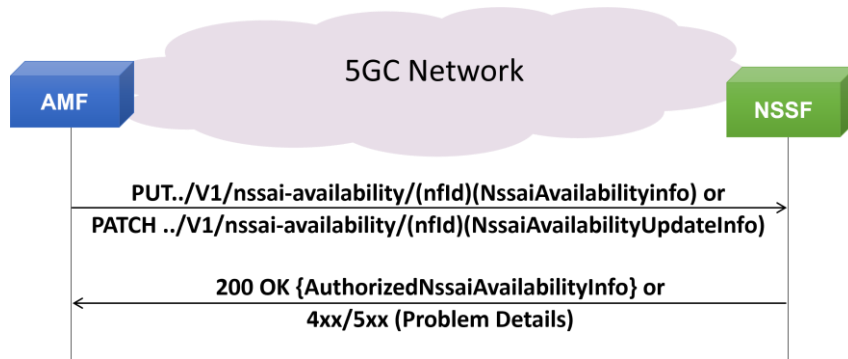
Get service operation



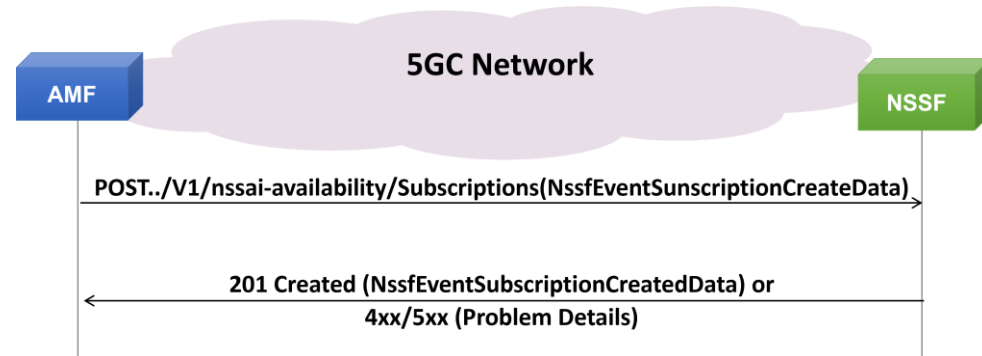
MAPS™ 5G N22 Interface Procedures (Contd.)

Nnssf_NSSAIAvailability Service

Update Service Operation



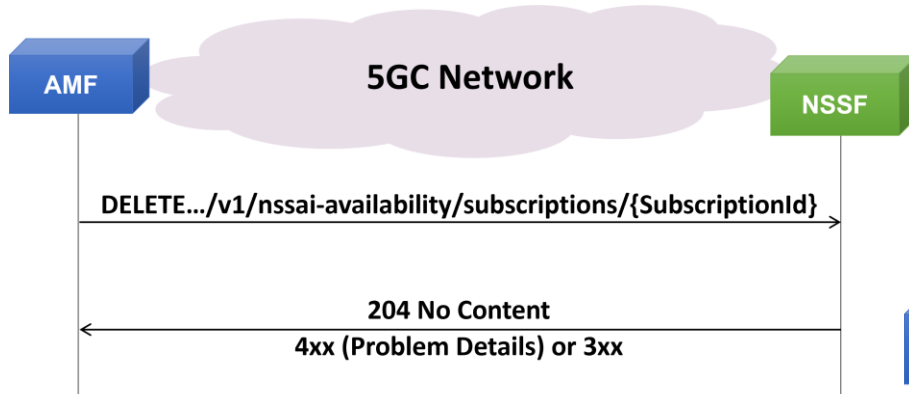
Subscribe Service Operation



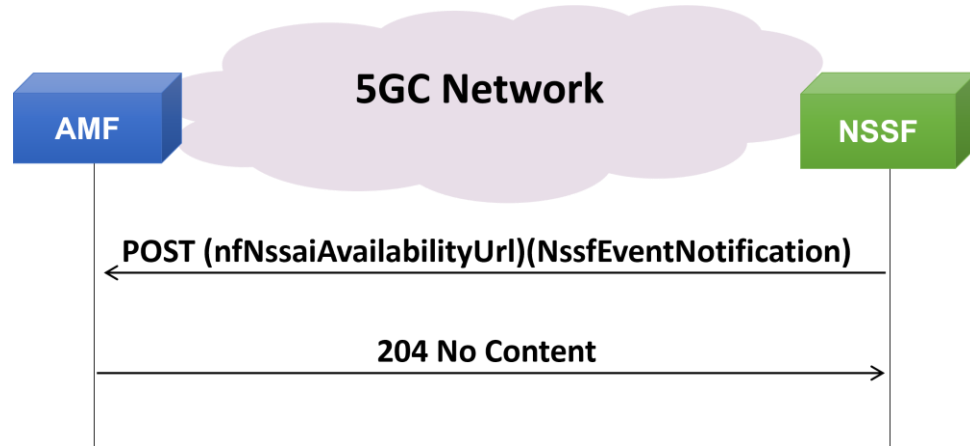
MAPS™ 5G N22 Interface Procedures (Contd.)

Nnssf_NSSAIAvailability Service

Unsubscribe Service Operation



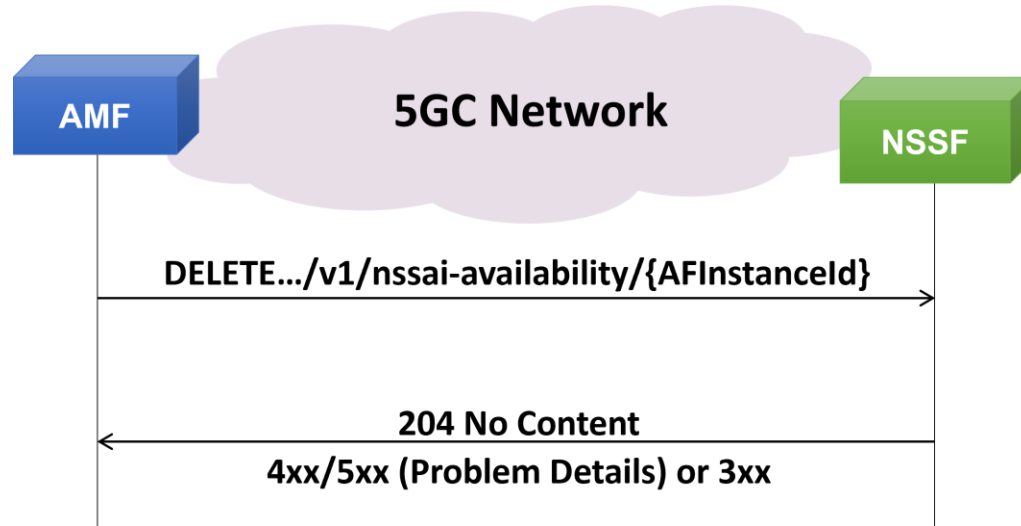
Notify Service Operation



MAPS™ 5G N22 Interface Procedures (Contd.)

Nnssf_NSSAIAvailability Service

Delete Service Operation



Thank you