

1. Issue Description:

UE fails to register after cell up without any alarm reporting.

2. Troubleshooting Procedure

Capture signal plane log:

192.168.5.9	SJ_F1AP	76	0	RRCDeliveryReport
192.168.5.9	F1AP/SJ_F1AP	102	0	UL Information Transfer, Authentication response MAC=0x00000000
192.168.5.9	SJ_NrRrcUIdcch	66	0	UL Information Transfer, Authentication response
192.168.5.9	SJ_NrRrcUIdcch	66	0	UL Information Transfer, Authentication response
192.168.5.9	SJ_NGAP	107	0	... UplinkNASTransport, Authentication response
192.168.5.9	SJ_NGAP	88	0	... DownlinkNASTransport, Security mode command
192.168.5.9	SJ_NrRrcUIdcch	66	0	DL Information Transfer, Security mode command
192.168.5.9	F1AP/SJ_F1AP	107	0	DL Information Transfer, Security mode command MAC=0x00000000
192.168.5.9	F1AP/SJ_F1AP	160	0	UL Information Transfer, Security mode complete, Registration request MAC=0x00000000
192.168.5.9	SJ_NrRrcUIdcch	124	0	UL Information Transfer, Security mode complete, Registration request
192.168.5.9	SJ_NrRrcUIdcch	124	0	UL Information Transfer, Security mode complete, Registration request
192.168.5.9	SJ_NGAP	165	0	... UplinkNASTransport, Security mode complete, Registration request
192.168.5.9	SJ_F1AP	76	0	RRCDeliveryReport
192.168.5.9	SJ_NGAP	291	0	... InitialContextSetupRequest, Registration accept
192.168.5.9	SJ_NrRrcUIdcch	60	0	Security Mode Command
192.168.5.9	F1AP/SJ_F1AP	86	0	Security Mode Command MAC=0x5e19c8f1
192.168.5.9	F1AP/SJ_F1AP	80	0	Security Mode Complete MAC=0x1df735d5
192.168.5.9	SJ_NrRrcUIdcch	60	0	Security Mode Complete
192.168.5.9	SJ_NrRrcUIdcch	60	0	UE Capability Enquiry
192.168.5.9	SJ_NrRrcUIdcch	132	0	DL Information Transfer, Registration accept
192.168.5.9	F1AP/SJ_F1AP	93	0	UE Capability Enquiry MAC=0xbb2b9226
192.168.5.9	F1AP/SJ_F1AP	173	0	DL Information Transfer, Registration accept MAC=0xe773795b
192.168.5.9	SJ_F1AP	76	0	RRCDeliveryReport
192.168.5.9	SJ_F1AP	76	0	RRCDeliveryReport
192.168.5.9	F1AP/SJ_F1AP	91	0	UL Information Transfer, Registration complete MAC=0xba896972
192.168.5.9	SJ_NGAP	68	0	... InitialContextSetupFailure
192.168.5.9	SJ_NGAP	63	0	UEContextReleaseCommand
192.168.5.9	SJ_NrRrcUIdcch	60	0	RRC Release
192.168.5.9	SJ_NGAP	81	0	... UEContextReleaseComplete
192.168.5.9	F1AP/SJ_F1AP	96	0	RRC Release MAC=0xf741a6ed
192.168.5.9	SJ_NrRrcUIdcch	132	0	DL Information Transfer, Registration accept
192.168.5.9	F1AP/SJ_F1AP	93	0	UE Capability Enquiry MAC=0xbb2b9226
192.168.5.9	F1AP/SJ_F1AP	173	0	DL Information Transfer, Registration accept MAC=0xe773795b
192.168.5.9	SJ_F1AP	76	0	RRCDeliveryReport
192.168.5.9	SJ_F1AP	76	0	RRCDeliveryReport
192.168.5.9	F1AP/SJ_F1AP	91	0	UL Information Transfer, Registration complete MAC=0xba896972
192.168.5.9	SJ_NGAP	68	0	... InitialContextSetupFailure
192.168.5.9	SJ_NGAP	63	0	UEContextReleaseCommand
192.168.5.9	SJ_NrRrcUIdcch	60	0	RRC Release


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value
  InitialContextSetupFailure
  protocols: 3 items
    Item 0: id-AMF-UE-NGAP-ID
      ProtocolIE-Field
        id: id-AMF-UE-NGAP-ID (10)
        criticality: ignore (1)
        value
          AMF-UE-NGAP-ID: 2971
    Item 1: id-RAN-UE-NGAP-ID
      ProtocolIE-Field
        id: id-RAN-UE-NGAP-ID (85)
        criticality: ignore (1)
        value
          RAN-UE-NGAP-ID: 21
    Item 2: id-Cause
      ProtocolIE-Field
        id: id-Cause (15)
        criticality: ignore (1)
        value
          Cause: radioNetwork (0)
            radioNetwork: failure-in-radio-interface-procedure (24)
  
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From signal, gNB reports “InitialContextSetupFailure” after “UE Capability Enquiry”.

Determine gNB handles UE capability information timeout.

IPV4 LOCAL	IPV4 LOCAL	IPV4 LOCAL	IPV4 LOCAL	IPV4 LOCAL	IPV4 LOCAL
192.168.5.9	SJ_NrRrcDlDcch	60	0	UE Capability Enquiry	
192.168.5.9	SJ_NrRrcDlDcch	132	0	DL Information Transfer, Registration accept	
192.168.5.9	F1AP/SJ_F1AP	93	0	UE Capability Enquiry MAC=0xbb2b9226	
192.168.5.9	F1AP/SJ_F1AP	173	0	DL Information Transfer, Registration accept MAC=0xe773795b	
192.168.5.9	SJ_F1AP	76	0	RRCDeliveryReport	
192.168.5.9	SJ_F1AP	76	0	RRCDeliveryReport	
192.168.5.9	F1AP/SJ_F1AP	91	0	UL Information Transfer, Registration complete MAC=0xba896972	

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DL-DCCH-Message
  message: c1 (0)
    c1: ueCapabilityEnquiry (6)
      ueCapabilityEnquiry
        rrc-TransactionIdentifier: 0
        criticalExtensions: ueCapabilityEnquiry (0)
          ueCapabilityEnquiry
            ue-CapabilityRAT-RequestList: 2 items
              Item 0
                UE-CapabilityRAT-Request
                  rat-Type: nr (0)
                  capabilityRequestFilter: 800404d0
                    UE-CapabilityRequestFilterNR
                      frequencyBandListFilter: 1 item
                        Item 0
                          FreqBandInformation: bandInformationNR (1)
                            bandInformationNR
                              bandNR: 78
              Item 1
                UE-CapabilityRAT-Request
                  rat-Type: eutra-nr (1)
            ue-CapabilityEnquiryExt: 9c
            UE-CapabilityEnquiry-v1560-IEs
              capabilityRequestFilterCommon
                mrdc-Request
  
```

Check the details of “UE Capability Enquiry” and see it also contains rat-type: eutra-nr
 eutra-nr capability information exceeds Femto handle ability. Need remove.

3. Solution

Cancel the “eutra-nr” capability enquiry, UE register succeeds.

For example: “UE capability Enquiry” after remove “eutra-nr” capability.

166	11:35:41.401	192.168.5.237	192.168.5.9	SJ_F1AP	76	0	RRCDeliveryReport
169	11:35:41.401	192.168.5.237	192.168.5.9	SJ_NrRrcDlDcch	60	0	Security Mode Complete
171	11:35:41.403	192.168.5.237	192.168.5.9	SJ_NrRrcDlDcch	60	0	UE Capability Enquiry
173	11:35:41.404	192.168.5.237	192.168.5.9	SJ_NrRrcDlDcch	132	0	DL Information Transfer, Registration accept
175	11:35:41.404	192.168.5.237	192.168.5.9	F1AP/SJ_F1AP	93	0	UE Capability Enquiry MAC=0x3502b486
176	11:35:41.404	192.168.5.237	192.168.5.9	F1AP/SJ_F1AP	173	0	DL Information Transfer, Registration accept

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> Frame 185: 1229 bytes on wire (9832 bits), 1229 bytes captured (9832 bits) on interface \Device\NPF_{8AB436B6-A780-4434-A039-5489D3B0B822}, id 0
> Ethernet II, Src: CloudNet_e7:da:bb (10:6f:d9:e7:da:bb), Dst: 20:7b:d2:0d:c0:ac (20:7b:d2:0d:c0:ac)
> Internet Protocol Version 4, Src: 192.168.5.237, Dst: 192.168.5.9
> User Datagram Protocol, Src Port: 50845, Dst Port: 50158
> CpCellApp
> NR Radio Resource Control (RRC) protocol
  UL-DCCH-Message
    message: c1 (0)
      c1: ueCapabilityInformation (9)
        ueCapabilityInformation
          rrc-TransactionIdentifier: 0
          criticalExtensions: ueCapabilityInformation (0)
            ueCapabilityInformation
              ue-CapabilityRAT-ContainerList: 1 item
                Item 0
                  UE-CapabilityRAT-Container
                    rat-Type: nr (0)
                    ue-CapabilityRAT-Container: e9a0100574f5a0302002c0a0241262c001306a0609b20c39f30c7942c0e09804062382...
  
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