

UE Register Failure

Country/Region: G/O

Equipment: nCell-F2240

Version: 5GNR_fa.tdd.fr1.2.3.0_457 (After
upgrade) +Firmware_241.00.2_N78_20221215_v2.0.11

1. Issue Description:

Same UE terminal can register under M4370, same SIM card can register under Femto when it's installed in BTI CPE CPX60P-A, but can't register under Femto when it's installed in Zebra Tablets.

Though there is only 1 UE terminal is on (zebra tablet), but several UEs were observed keep trying to attach. Keep connecting and releasing.

```
odi: rx 13 bytes (1 msg) from /tmp/odsServer.sock.7550
odi: command time measured: 0.000420160 sec
odi: ok ( odi -n duapp0 display-ue-info )
root@localhost:~# odi -n duapp0 display-ue-info
odi: tx 31 bytes to port 0 on
UE Crntti: 2269 Profile State: Supervised
UE Crntti: 2109 Profile State: Supervised

odi: rx 99 bytes (1 msg) from /tmp/odsServer.sock.7550
odi: command time measured: 0.000826600 sec
odi: ok ( odi -n duapp0 display-ue-info )
root@localhost:~# odi -n duapp0 display-ue-info
odi: tx 31 bytes to port 0 on
UE Crntti: 7517 Profile State: Supervised
UE Crntti: 7901 Profile State: Supervised

odi: rx 99 bytes (1 msg) from /tmp/odsServer.sock.7550
odi: command time measured: 0.000939240 sec
odi: ok ( odi -n duapp0 display-ue-info )
root@localhost:~# odi -n duapp0 display-ue-info
odi: tx 31 bytes to port 0 on
UE Crntti: 1565 Profile State: Supervised
UE Crntti: 925 Profile State: Supervised

odi: rx 98 bytes (1 msg) from /tmp/odsServer.sock.7550
odi: command time measured: 0.000820840 sec
odi: ok ( odi -n duapp0 display-ue-info )
root@localhost:~# odi -n duapp0 display-ue-info
odi: tx 31 bytes to port 0 on
UE Crntti: 1501 Profile State: Supervised
UE Crntti: 957 Profile State: Supervised

odi: rx 98 bytes (1 msg) from /tmp/odsServer.sock.7550
odi: command time measured: 0.001273080 sec
odi: ok ( odi -n duapp0 display-ue-info )
root@localhost:~# odi -n duapp0 display-ue-info
odi: tx 31 bytes to port 0 on
UE Crntti: 3709 Profile State: Supervised
UE Crntti: 3549 Profile State: Reserved
UE Crntti: 4061 Profile State: Supervised

odi: rx 140 bytes (1 msg) from /tmp/odsServer.sock.7550
odi: command time measured: 0.001310520 sec
```

OpState	connected
AMF State	connecting
Online UE	3
UpTime	0:2:36
CurrentAlarm	0

2. Suggested Troubleshooting Methods:

- Collect signal plane log to analyze.
- Configuration parameter check by web check and xml comparison.
- Gather log +Signal plane + FAPI log analysis.

3. Troubleshooting Procedures:

- a) From logs, UE not responds UE capability information and gNodeB respond initial contextSetupFailure.

11:29:17.451344000	中...	127.0.0.1	127.0.0.1	SJ_NGAP	194	88	88	InitialContextSetupRequest
11:29:17.453752000	中...	127.0.0.1	127.0.0.1	SJ_NrRrcDlD...	47			Security Mode Command
11:29:17.454278000	中...	127.0.0.1	127.0.0.1	SJ_F1AP	88			DLRRMessageTransfer
11:29:17.476922000	中...	127.0.0.1	127.0.0.1	SJ_F1AP	82			ULRRMessageTransfer
11:29:17.477574000	中...	127.0.0.1	127.0.0.1	SJ_NrRrcUld...	46			Security Mode Complete
11:29:17.479058000	中...	127.0.0.1	127.0.0.1	SJ_NrRrcDlD...	54			UE Capability Enquiry


```

ueCapabilityEnquiry
  rrc-TransactionIdentifier: 0
  criticalExtensions: ueCapabilityEnquiry (0)
    ueCapabilityEnquiry
      ue-CapabilityRAT-RequestList: 2 items
        Item 0
          UE-CapabilityRAT-Request
            rat-Type: nr (0)
            capabilityRequestFilter: 800404d0
        Item 1
          UE-CapabilityRAT-Request
            rat-Type: eutra-nr (1)
      ue-CapabilityEnquiryExt: 9c
      UE-CapabilityEnquiry-v1560-IEs
        capabilityRequestFilterCommon
          mrdc-Request
            omitEN-DC: true (0)
            includeNR-DC: true (0)

```

2022 11:29:18.466911000	中...	127.0.0.1	127.0.0.1	SJ_NGAP	71	88	88	InitialContextSetupFailure
2022 11:29:18.467226000	中...	127.0.0.1	127.0.0.1	SJ_NGAP	84	88	88	UEContextReleaseComplete
2022 11:29:18.468087000	中...	127.0.0.1	127.0.0.1	SJ_F1AP	87			UEContextReleaseCommand
2022 11:29:18.468281000	中...	127.0.0.1	127.0.0.1	SJ_F1AP	93			DLRRMessageTransfer

```

criticality: ignore (1)
  value
    Cause: radioNetwork (0)
      radioNetwork: failure-in-radio-interface-procedure (24)

```

- b) Check the configuration and compare xml files, no abnormalities were found.
- c) Collect Gatherlog and signal plane logs at same time, from the log, gNb handle UE capability timeout, It could be that UE not sent out or gNodeB cant handle.

"2022/09/06 CST 11:29:17.479952 cpcellapp0[25148] DEBUG 2862690 UeState.cc:3647 UeAwaitCapability::handleUeCapabilityReTxTimeout Ueld[105] crnti[7261]-----

2022/09/06 CST 11:29:17.479952 cpcellapp0[25148] DEBUG 2862691 UeClass.h:2976 UeClass::startUeTimerEvent[UEDEFAULTTIMEOUT] with timer[RRCUECAP_TIMER: 0 seconds 500000 useconds] now"

Collect the access signal plane log of same UE terminal under M4370 for comparison. The packet size of UE capability information is more than default MSS 1500.

num	Time	Source	Destination	Protocol	length	DNN	SOI	Info
5	2022-10-31 19:40:21.214742	192.168.180.71	192.168.180.68	NGAP/NAS-SGS	156			UplinkNASTransport, Authentication response
6	2022-10-31 19:40:21.222695	192.168.180.68	192.168.180.71	NGAP/NAS-SGS	128			DownlinkNASTransport, Security mode command
7	2022-10-31 19:40:21.245521	192.168.180.71	192.168.180.68	NGAP/NAS-SGS/...	200			UplinkNASTransport, Security mode complete, Regi
8	2022-10-31 19:40:21.247664	192.168.180.71	192.168.180.68	NGAP/NAS-SGS	232			InitialContextSetupRequest, Registration accept
9	2022-10-31 19:40:21.325582	192.168.180.71	192.168.180.68	SCTP	1016			DATA (Message Fragment)
10	2022-10-31 19:40:21.325639	192.168.180.71	192.168.180.68	NGAP	88			InitialContextSetupResponse
11	2022-10-31 19:40:21.326964	192.168.180.71	192.168.180.68	NGAP/NAS-SGS	120			UplinkNASTransport, Registration complete
12	2022-10-31 19:40:22.346526	192.168.180.71	192.168.180.68	SCTP	1500			DATA (Message Fragment)
13	2022-10-31 19:40:22.347907	192.168.180.71	192.168.180.68	NGAP	1516			UERadioCapabilityInfoIndication
14	2022-10-31 19:40:22.350448	192.168.180.68	192.168.180.71	NGAP/NAS-SGS	136			DownlinkNASTransport, Configuration update comma
15	2022-10-31 19:40:22.350554	192.168.180.68	192.168.180.71	NGAP	88			UEContextReleaseCommand
16	2022-10-31 19:40:22.358281	192.168.180.71	192.168.180.68	NGAP	104			UEContextReleaseComplete
17	2022-10-31 19:40:34.147089	192.168.180.71	192.168.180.68	NGAP/NAS-SGS/...	160			InitialUEMessage, Service request, Service reque

M4370 not enquiry capability of EN-DC, but Femto enquiry the capability of EN-DC.

Collect the fapi3 log when pre-schedule is enabled, can observe the UE capability

information were reported to gNodeB, but failed to wrap due to big package size. Need develop a new version to remove the enquiry of EN-DC capability.

```

312 0.961218 S3 NGAP 66 UEContextReleaseCommand
326 0.992078 RLC-NR 401 1,1,Short BSR 7773 331,3,UEID-7773 [UL] [AM] SRB:1 [CONTROL] ACK_SN=6 || UEID=7773 [UL] [AM] SRB:1 [DATA] SN=5
359 0.993047 S3_F1AP 78 7773 RRDeliveryReport
370 0.998092 MAC-NR 1084 1 7773 3326 UL-SCH [Malformed Packet]
377 1.000637 MAC-NR 1084 1 7773 3326 UL-SCH [Malformed Packet]
384 1.002615 NR RRC/NAS 5- 1084 1,1,Long BSR_Padding 7773 6973 149,21,UEID-7773 [UL] [AM] SRB:1 [DATA] (P) SN=5 SO=6973 ..145-bytes || , UL Information Transfer
387 1.002455 F1AP/S1_F1AP 93 7773 UL Information Transfer MAC-0x540431c3
396 1.021787 S3_NrRrcCID= 46 RRC Release
399 1.023468 S3_NGAP 71 InitialContextSetupFailure
302 1.023680 S3_NGAP 84 UEContextReleaseComplete
306 1.024411 F1AP/S1_F1AP 87 7709 RRC Release MAC-0x70756182
311 1.025259 S3_F1AP 84 7709 UEContextReleaseComplete
315 1.025661 NR RRC 108 10 RRC Release [8-bytes] (Padding 35 bytes)
321 1.026615 RLC-NR 92 9 UEID=7773 [DL] [AM] SRB:1 [CONTROL] ACK_SN=7 NACK_SN=5 (S0start=329 S0end=6972) (Padding 26
328 1.030969 NR RRC 108 10 RRC Release [8-bytes] (Padding 35 bytes)

Index: 0
dlc: 276592
-NR UL-SCH (LCID:1 149 bytes) || (LCID:1 21 bytes) (Long BSR) (Padding 846 bytes)
[Context (RNTI-7773)]
Subheader: (LCID:1 149 bytes)
RLC-NR [UEID=7773 [UL] [AM] SRB:1 [DATA] (P) SN=5 SO=6973 ..145-bytes]
> [Context]
  AM Header (P) SN=5 SO=6973
    1... .. = Data/Control: Data PDU
    1... .. = Polling Bit: Status report is requested
    1... .. = Segmentation Info: Data field contains the last segment of an RLC SDU (0x2)
    1... .. = RLC SN: Sequence Number: 5
    Segment Offset: 6973

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After upgrade new version which remove the capability enquiry of EN-DC, UE (Zebra tablets) registered successfully.

4. Conclusion.

The UE Terminal supports EN-DC and Femto also enquire the capability of EN_DC, the big size packet of UE capability information can't be handled by existing Femto version. The latest version 5G NR fa.tdd.fr1.2.3.0 457 has fixed it.