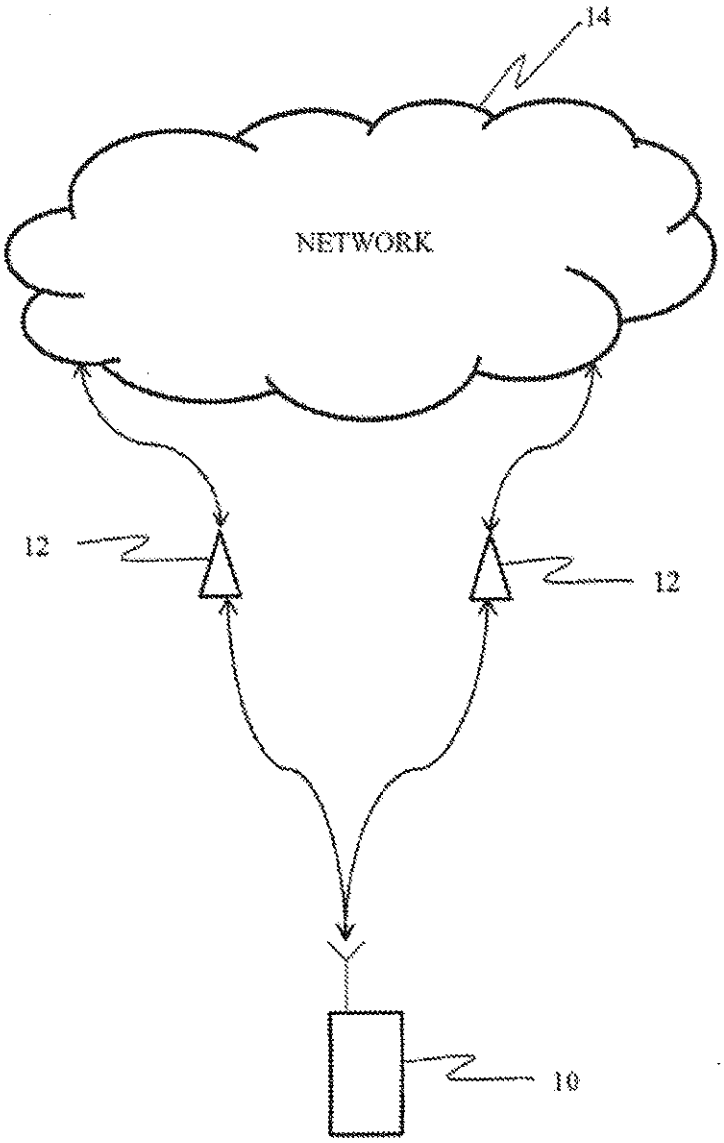

Fig. 1

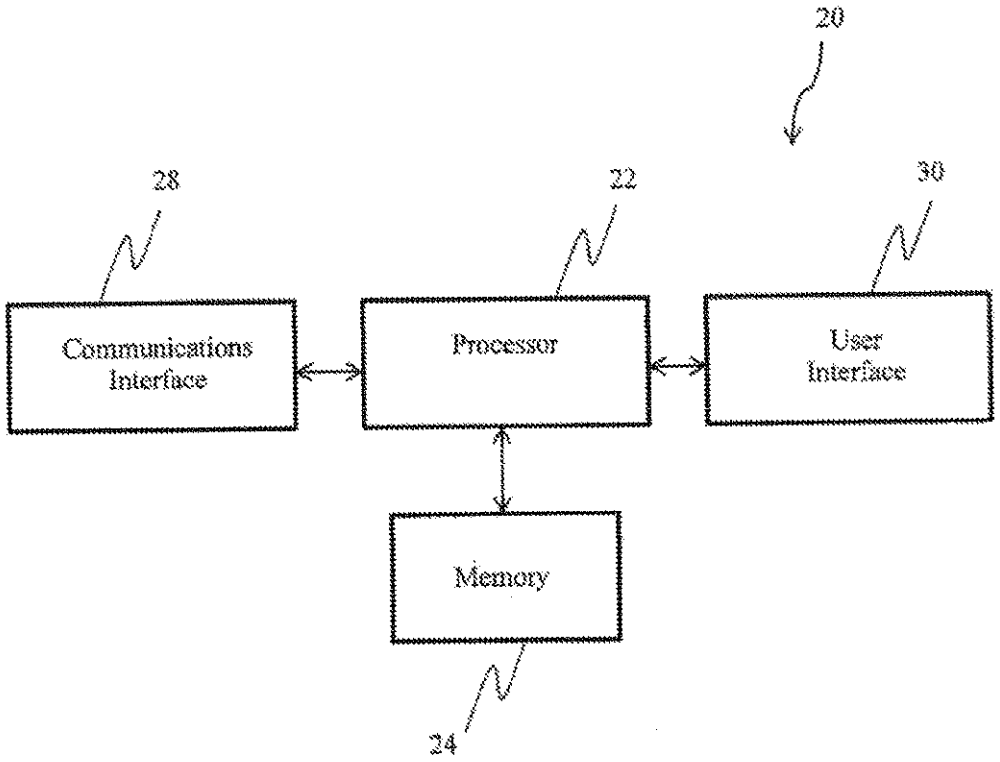
20
28
22
30
Communications Interface
Processor
User Interface
Memory
24

Fig. 2

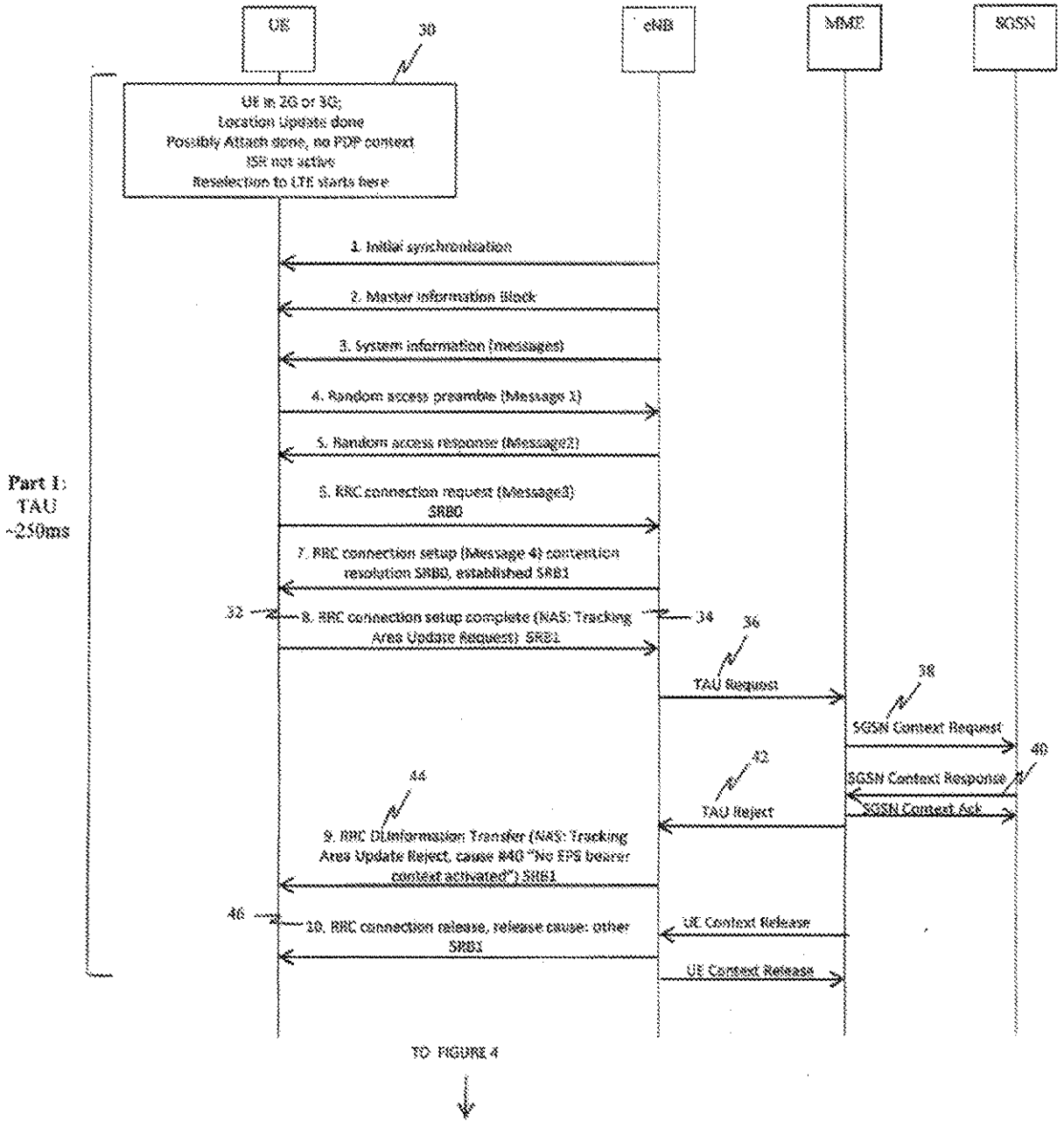
UE
eNB
MME
SGSN
30
UE in 2G or 3G;
Location Update done
Possibly Attach done, no PDP context
ISR not active
Reselection to LTE starts here
1. Initial synchronization
2. Master information block
3. System information (messages)
4. Random access preamble (Message 1)
5. Random access response (Message2)
6. RRC connection request (Message3)
SRB0
7. RRC connection setup (Message 4) contention resolution SRB0, established SRB1
32
8. RRC connection setup complete (NAS: Tracking Area Update Request) SRB1
34
36
TAU Request
38
SGSN Context Request
40
SGSN Context Response
SGSN Context Ack
42
TAU Reject
44
9. RRC DLInformation Transfer (NAS: Tracking Area Update Reject, cause #40 "No EPS bearer context activated") SRB1
46
10. RRC connection release, release cause: other
SRB1
UE Context Release
UE Context Release
Part 1:
TAU
~250ms
TO FIGURE 4

Fig. 3

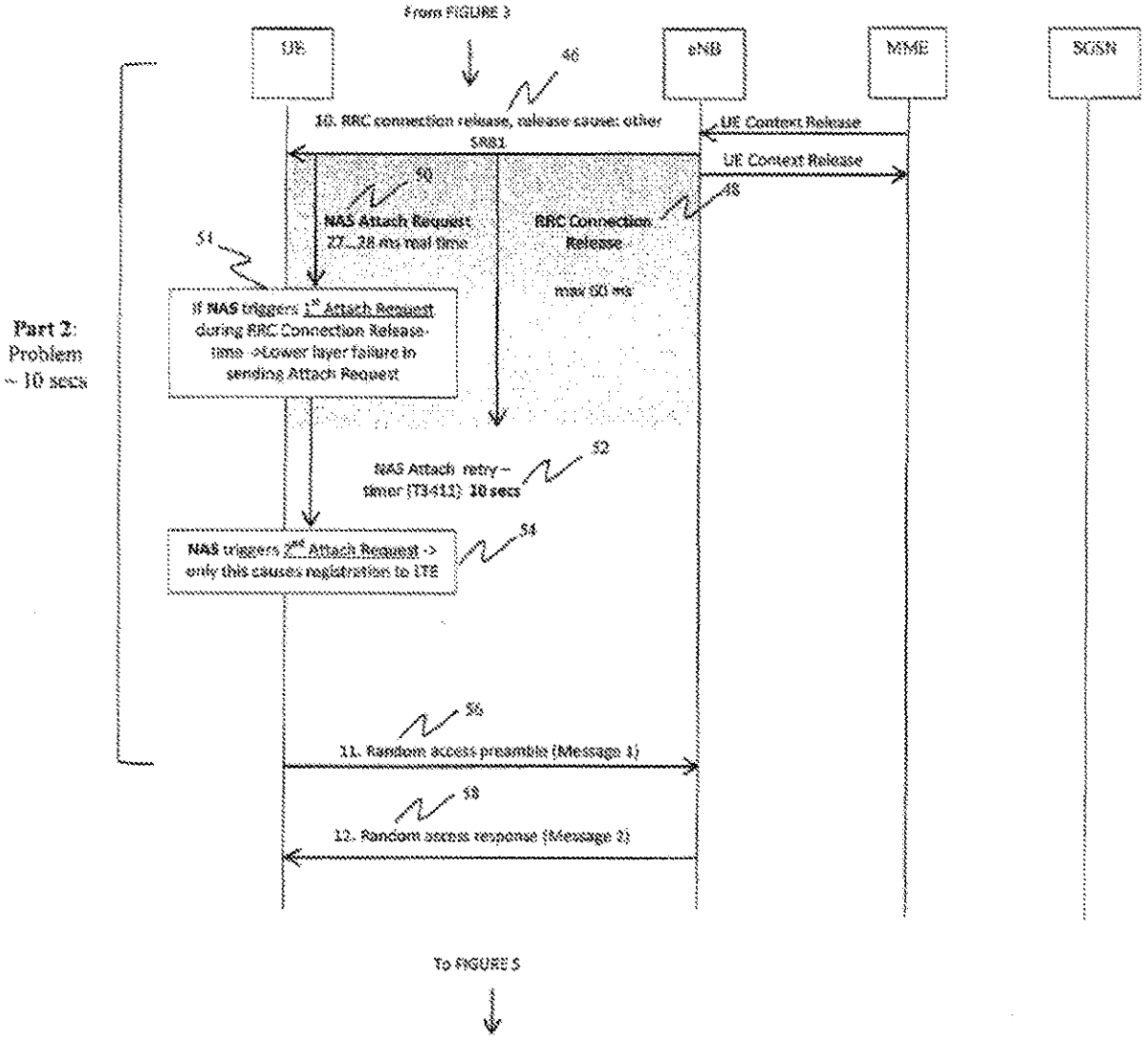
From FIGURE 3
UE
eNB
MME
SGSN
46
10. RRC connection release, release cause: other
SRB1
UE Context Release
UE Context Release
48
50
NAS Attach Request
27...38 ms real time
RRC Connection Release
max 50 ms
51
If NAS triggers 1st Attach Request during RRC Connection Release time -> lower layer failure in sending Attach Request
52
NAS Attach retry – timer (T3411) 10 secs
54
NAS triggers 2nd Attach Request -> only this causes registration to LTE
Part 2: Problem ~ 10 secs
56
11. Random access preamble (Message 1)
58
12. Random access response (Message 2)
To FIGURE 5

Fig. 4

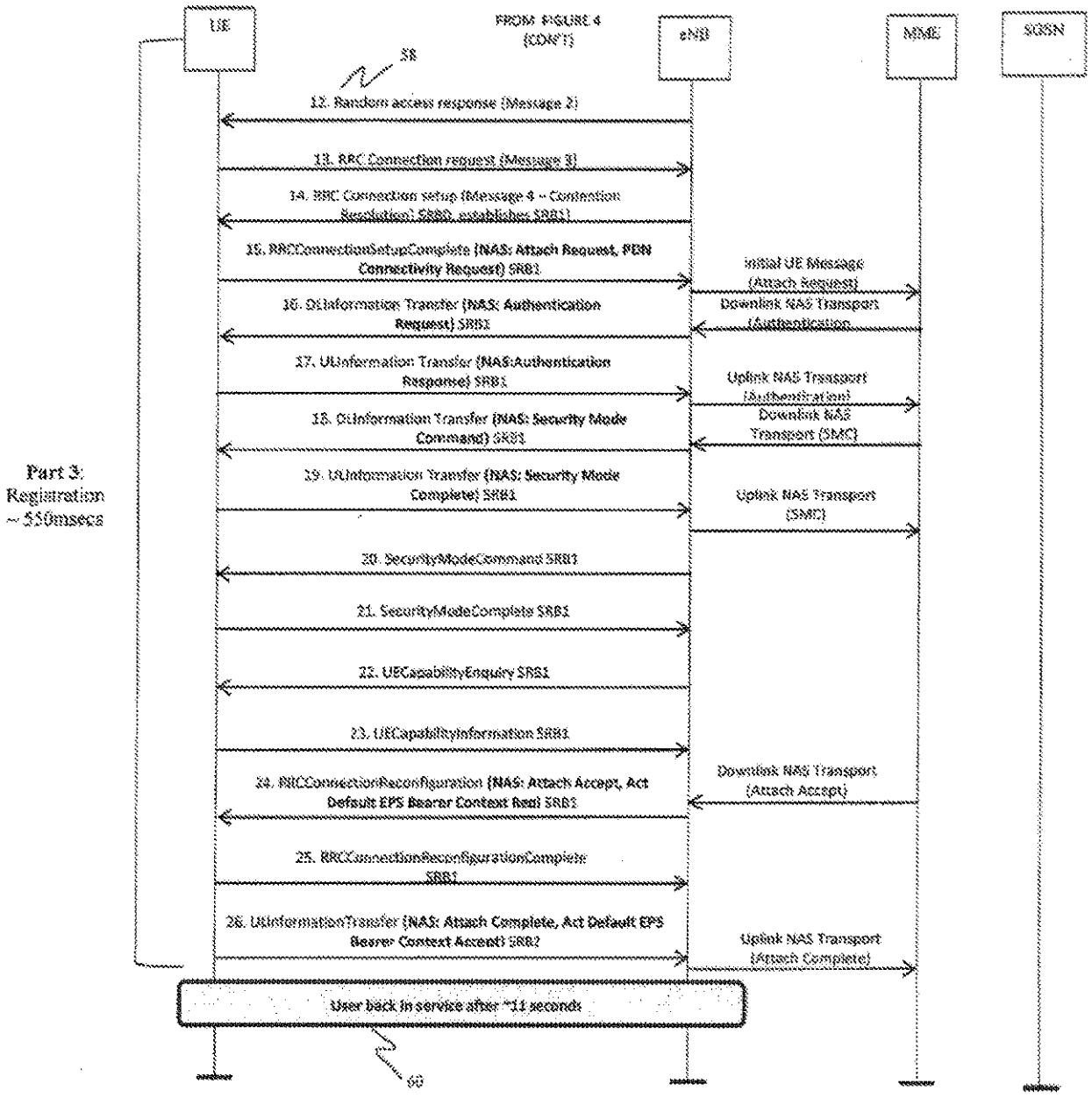
Part 3:
Registration
~ 550msecs
UE
FROM FIGURE 4
(CONT)
eNB
MME
SGSN
58
12. Random access response (Message 2)
13. RRC Connection request (Message 3)
14. RRC Connection setup (Message 4 – Contention Resolution) SRB0, establishes SRB1
15. RRCConnectionSetupComplete (NAS: Attach Request, PDN Connectivity Request) SRB1
Initial UE Message (Attach Request)
16. DLInformation Transfer (NAS: Authentication Request) SRB1
Downlink NAS Transport (Authentication
17. ULInformation Transfer (NAS:Authentication Response) SRB1
Uplink NAS Transport (Authentication)
18. DLInformation Transfer (NAS: Security Mode Command) SRB1
Downlink NAS Transport (SMC)
19. ULInformation Transfer (NAS: Security Mode Complete) SRB1
Uplink NAS Transport (SMC)
20. SecurityModeCommand SRB1
21. SecurityModeComplete SRB1
22. UECapabilityEnquiry SRB1
23. UECapabilityInformation SRB1
24. RRCConnectionReconfiguration (NAS: Attach Accept, Act Default EPS Bearer Context Req) SRB1
Downlink NAS Transport (Attach Accept)
25. RRCConnectionReconfigurationComplete SRB1
26. ULInformationTransfer (NAS: Attach Complete, Act Default EPS Bearer Context Accept) SRB2
Uplink NAS Transport (Attach Complete)
User back in service after ~11 seconds
60

Fig. 5

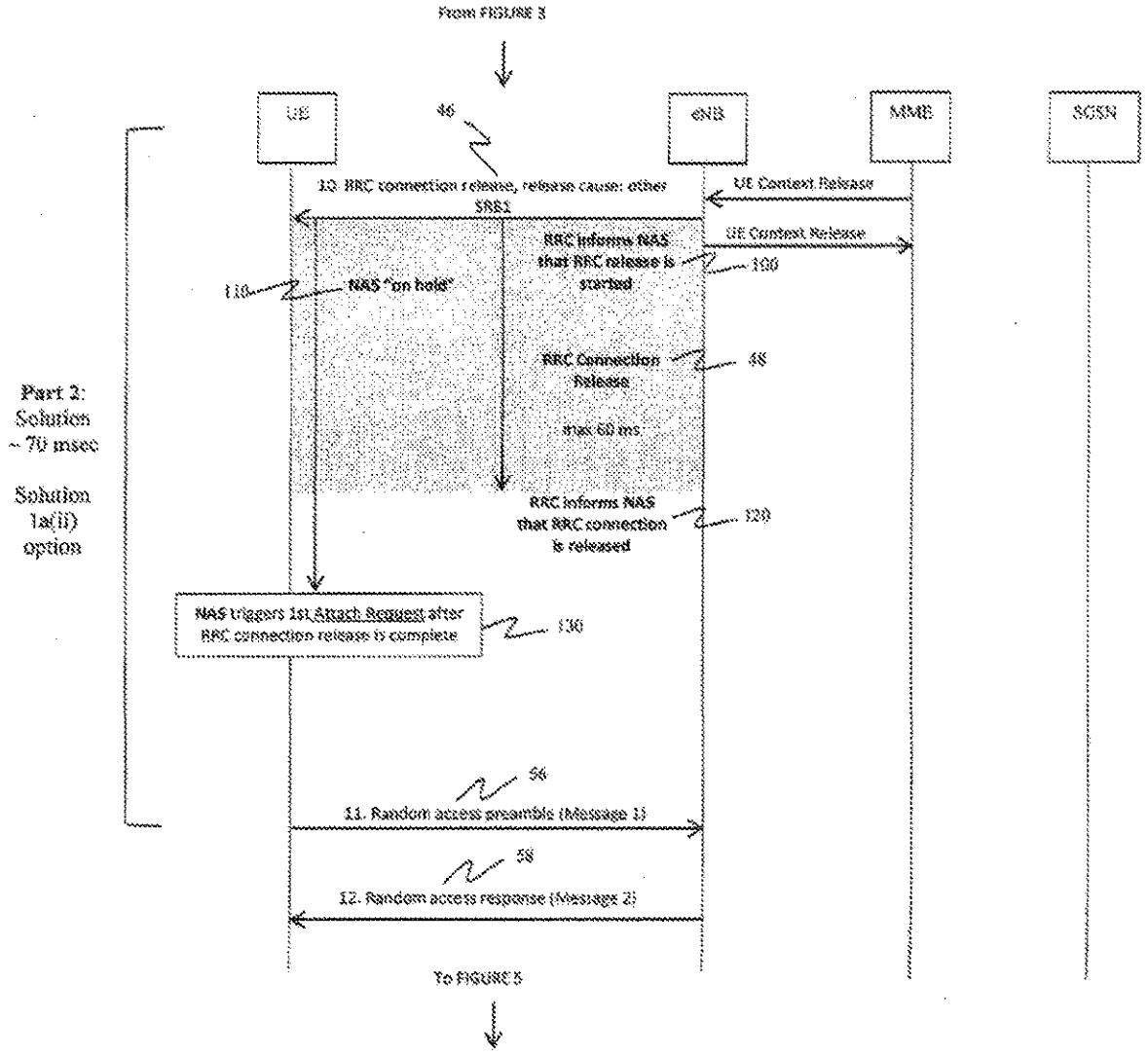
From FIGURE 3
UE
eNB
MME
SGSN
46
10. RRC connection release, release cause: other
SRB1
UE Context Release
UE Context Release
RRC informs NAS that RRC release is started
100
110
NAS "on hold"
RRC Connection Release
48
max 60 ms
Part 2: Solution ~ 70 msec
Solution 1a(ii) option
RRC informs NAS that RRC connection is released
120
NAS triggers 1st Attach Request after RRC connection release is complete
130
56
11. Random access preamble (Message 1)
58
12. Random access response (Message 2)
To FIGURE 5

Fig. 6

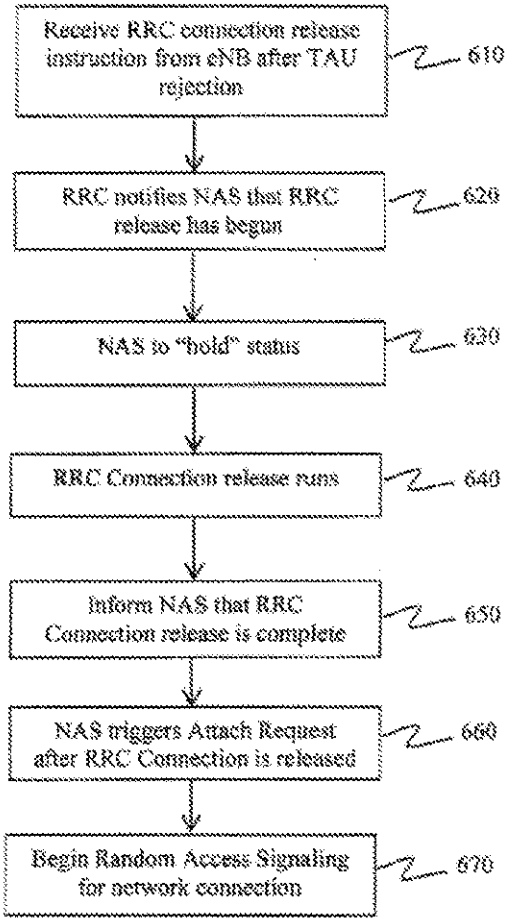
Receive RRC connection release instruction from eNB after TAU rejection
610
RRC notifies NAS that RRC release has begun
620
NAS to "hold" status
630
RRC Connection release runs
640
Inform NAS that RRC Connection release is complete
650
NAS triggers Attach Request after RRC Connection is released
660
Begin Random Access Signaling for network connection
670

Fig. 7