

UE:

None.

Preamble:

- The UE is in state Generic RB Established (state 3) according to [18] in cell 1

#### 7.1.2.2.3.2 Test procedure sequence

**Table 7.1.2.2.3.2-1: Main behaviour**

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS transmits a PDCCH order providing Random Access Preamble.	<--	(PDCCH Order)	-	-
2	Check: does the UE transmit a preamble on PRACH using the same preamble index as given in step 1?	-->	(PRACH Preamble)	1	P
3	Check: does the UE transmit a preamble on PRACH after <i>ra-ResponseWindowSize</i> using the same preamble index as given in step 1?	-->	(PRACH Preamble)	2	P
4	Check: does the UE transmit a preamble on PRACH after <i>ra-ResponseWindowSize</i> using the same preamble index as given in step 1?	-->	(PRACH Preamble)	2	P
5	Check: does the UE transmit a preamble on PRACH after <i>ra-ResponseWindowSize</i> using the same preamble index as given in step 1?	-->	(PRACH Preamble)	2	P
6	The SS transmits Random Access Response with RAPID corresponding to Preamble in step 1.	<--	Random Access Response	-	-
7	Check: does the test result of CALL generic procedure indicate that UE is in E-UTRA RRC_CONNECTED state?	-	-	2	-

#### 7.1.2.2.3.3 Specific message contents

**Table 7.1.2.2.3.3-1: SystemInformationBlockType2 (all steps, table 7.1.2.2.3.2-1)**

Derivation Path: 36.508 clause 4.4.3.3, Table Nr. 4.4.3.3.-1				
Information Element	Value/Remark	Comment	Condition	
SystemInformationBlockType2 ::= SEQUENCE {				
radioResourceConfigCommon SEQUENCE {				
rach-Configuration SEQUENCE {				
ra-SupervisionInformation SEQUENCE {				
preambleTransMax	N4	PREAMBLE_TRANS_MAX		
}				
}				
}				
}				

### 7.1.2.3 Correct selection of RACH parameters / Preamble selected by MAC itself / Contention based random access procedure

#### 7.1.2.3.1 Test Purpose (TP)

(1)

```

with { UE in E-UTRA RRC_IDLE state }
ensure that {
  when { SS sends a Paging message to the UE and MAC PDU Size carrying CCCH PDU is less than
messageSizeGroupA }
  then { UE transmits a random access preamble using a preamble in group A of random access
preambles indicated in SIB2 }

```

```

    }

```

(2)

```

with { UE in E-UTRA RRC_IDLE state and has transmitted Msg3 }
ensure that {
  when { SS does not respond before contention resolution timer expiry }
  then { UE transmits a random access preamble using a preamble in the same group of random access
preambles as used for the first transmission of Msg3 }
}

```

(3)

```

with { UE in E-UTRA RRC_IDLE state and has transmitted Msg3 }
ensure that {
  when { SS does not respond before contention resolution timer expiry after more than
preambleTransMax transmissions from UE }
  then { UE transmits a random access preamble using a preamble in the same group of random access
preambles as used for the first transmission of Msg3 }
}

```

(4)

```

with { UE in E-UTRA RRC_IDLE state }
ensure that {
  when { UE has data available for transmission and the MAC PDU Size carrying this data is greater
than messageSizeGroupA }
  then { UE transmits a random access preamble using a preamble in group B of random access
preambles indicated in SIB2 }
}

```

#### 7.1.2.3.2 Conformance requirements

References: The conformance requirements covered in the current TC are specified in: TS 36.321, clause 5.1.2 and 5.1.5.

[TS 36.321, clause 5.1.2]

The Random Access Resource selection procedure shall be performed as follows:

- If *ra-PreambleIndex* (*Random Access Preamble*) and *ra-PRACH-MaskIndex* (*PRACH Mask Index*) have been explicitly signalled and *ra-PreambleIndex* is not 000000:
  - ...
- else the Random Access Preamble shall be selected by the UE as follows:
  - If *Msg3* has not yet been transmitted, the UE shall:
    - if Random Access Preambles group B exists and if the potential message size (data available for transmission plus MAC header and, where required, MAC control elements) is greater than *messageSizeGroupA* and if the pathloss is less than  $P_{\text{CMAX}} - \text{preambleInitialReceivedTargetPower} - \text{deltaPreambleMsg3} - \text{messagePowerOffsetGroupB}$ , then:
      - select the Random Access Preambles group B;
      - else:
        - select the Random Access Preambles group A.
    - else, if *Msg3* is being retransmitted, the UE shall, the UE shall:
      - select the same group of Random Access Preambles as was used for the preamble transmission attempt corresponding to the first transmission of *Msg3*.
  - randomly select a Random Access Preamble within the selected group. The random function shall be such that each of the allowed selections can be chosen with equal probability;
  - set PRACH Mask Index to 0.

- determine the next available subframe containing PRACH permitted by the restrictions given by the *prach-ConfigIndex* and PRACH Mask Index (see subclause 7.3) and physical layer timing requirements [2] (a UE may take into account the possible occurrence of measurement gaps when determining the next available PRACH subframe);
- if the transmission mode is TDD and the PRACH Mask Index is equal to zero:
  - if *ra-PreambleIndex* was explicitly signalled and the signalled random access preamble ID was not 000000 (i.e., not selected by MAC):
    - randomly select, with equal probability, one PRACH from the PRACHs available in the determined subframe.
  - else:
    - randomly select, with equal probability, one PRACH from the PRACHs available in the determined subframe and the next two consecutive subframes.
- else:
  - determine a PRACH within the determined subframe in accordance with the requirements of the PRACH Mask Index.
- proceed to the transmission of the Random Access Preamble (see subclause 5.1.3).

[TS 36.321, clause 5.1.5]

Contention Resolution is based on either C-RNTI on PDCCH or UE Contention Resolution Identity on DL-SCH..

Once Msg3 is transmitted, the UE shall:

- start *mac-ContentionResolutionTimer* and restart *mac-ContentionResolutionTimer* at each HARQ retransmission;
- regardless of the possible occurrence of a measurement gap, monitor the PDCCH until *mac-ContentionResolutionTimer* expires or is stopped;
- ...
- if *mac-ContentionResolutionTimer* expires:
  - discard the Temporary C-RNTI;
  - consider the Contention Resolution not successful.
- if the Contention Resolution is considered not successful the UE shall:
  - flush the HARQ buffer used for transmission of the MAC PDU in the Msg3 buffer;
  - increment PREAMBLE\_TRANSMISSION\_COUNTER by 1;
  - If PREAMBLE\_TRANSMISSION\_COUNTER = *preambleTransMax* + 1:
    - indicate a Random Access problem to upper layers.
- ...
- proceed to the selection of a Random Access Resource (see subclause 5.1.2).

### 7.1.2.3.3 Test description

#### 7.1.2.3.3.1 Pre-test conditions

System Simulator:

- Cell 1.
- System information set using parameters as specified in Table 7.1.2.3.3.3-1.

UE:

None.

Preamble:

- The UE is in state Registered, Idle mode, Test Mode Activated (State 2A) according to [18].

## 7.1.2.3.3.2 Test procedure sequence

Table 7.1.2.3.3.2-1: Main behaviour

St	Procedure	Message Sequence		TP	Verdict
		U - S	Message		
1	The SS transmits a Paging message including a matched identity.	-	-	-	-
2	Check: Does the UE transmit preamble on PRACH using a preamble in group A defined in SIB2 ( <i>numberOfRA-Preambles</i> and <i>sizeOfRA-PreamblesGroupA</i> )?	-->	PRACH Preamble	1	P
3	Check: Does the UE transmit preamble on PRACH using a preamble in group A defined in SIB2 ( <i>numberOfRA-Preambles</i> and <i>sizeOfRA-PreamblesGroupA</i> )?	-->	PRACH Preamble	1	P
4	Check: Does the UE transmit preamble on PRACH using a preamble in group A defined in SIB2 ( <i>numberOfRA-Preambles</i> and <i>sizeOfRA-PreamblesGroupA</i> )?	-->	PRACH Preamble	1	P
5	The SS transmits Random Access Response with RAPID corresponding to the transmitted Preamble in step 4, including T-CRNTI and not including Backoff Indicator sub header.	<--	Random Access Response	-	-
6	The UE transmits an <i>RRConnectionRequest</i> message.	-->	MAC PDU	-	-
7	Check: Does the UE transmit preamble on PRACH using a preamble belonging to group A?	-->	PRACH Preamble	2	P
8	Check: Does the UE continue to repeatedly transmit for 2s after step 2 a preamble belonging to group A? Note: 2s is the value of T300.	-->	PRACH Preamble	2, 3	P
9	The UE is in state Loopback Activated (state 4) according to [18] using parameters as specified in Table 7.1.2.3.3.3-2	-	-	-	-
10	The SS transmits a MAC PDU containing a PDCP SDU of size 320 bits[>208].	<--	MAC PDU	-	-
-	Exception: steps 11 and 12 are repeated <i>dsr-TransMax</i> times.	-	-	-	-
11	UE transmits a Scheduling Request.	-->	Scheduling Request	-	-
12	The SS does not allocate UL grant for the scheduling request in step 11.	-	-	-	-
13	Check: Does the UE transmit preamble on PRACH using a preamble in group B defined in SIB2 ( <i>numberOfRA-Preambles</i> and <i>sizeOfRA-PreamblesGroupA</i> )?	-->	PRACH Preamble	4	P
14	Check: Does the UE transmit preamble on PRACH using a preamble in group B defined in SIB2 ( <i>numberOfRA-Preambles</i> and <i>sizeOfRA-PreamblesGroupA</i> )?	-->	PRACH Preamble	4	P
15	Check: Does the UE transmit preamble on PRACH using a preamble in group B defined in SIB2 ( <i>numberOfRA-Preambles</i> and <i>sizeOfRA-PreamblesGroupA</i> )?	-->	PRACH Preamble	4	P
16	The SS transmits Random Access Response with RAPID corresponding to the transmitted Preamble in step 15, including T-CRNTI and not including Backoff Indicator sub header.	<--	Random Access Response	-	-
17	The UE transmits a MAC PDU with C-RNTI containing loop backed PDCP SDU	->	MAC PDU	-	-
18	The SS ignores the UL MAC PDU and does not allocate UL grant for the C-RNTI in step 17.	-	-	-	-
19	Check: Does the UE transmit preamble on PRACH using a preamble belonging to group B?	-->	PRACH Preamble	2	P

20	The SS transmits Random Access Response with RAPID corresponding to the transmitted Preamble in step 19	<--	Random Access Response	-	-
21	The UE transmits a MAC PDU containing loop backed PDCP SDU	-->	MAC PDU	-	-
22	SS sends PDCCH transmission for UE C-RNTI	-	-	-	-
Note: Size of RRCConnectionRequest message is 45 bits, octet aligned =48 bits. With 8 bits of MAC Header the minimum size of MAC PDU carrying RRCConnectionRequest is 56 bits.					

### 7.1.2.3.3.3 Specific message contents

**Table 7.1.2.3.3.3-1: SystemInformationBlockType2 (all steps, table 7.1.2.3.3.2-1)**

Derivation path: 36.508 clause 4.4.3.3, Table 4.4.3.3-1			
Information Element	Value/Remark	Comment	Condition
SystemInformationBlockType2 ::= SEQUENCE {			
radioResourceConfigCommon SEQUENCE {			
rach-Configuration SEQUENCE {			
preambleInformation SEQUENCE {			
numberOfRA-Preambles	n64		
preamblesGroupAConfig := {SEQUENCE {			
sizeOfRA-PreamblesGroupA	n28		
messageSizeGroupA	b208		
messagePowerOffsetGroupB	minusinfinity		
}			
}			
}			
}			
ue-TimersAndConstants SEQUENCE{			
t300	ms2000	T300	
}			
}			
}			
}			

**Table 7.1.2.3.3.3-2: RLC-Config-DRB-AM**

Derivation path: 36.508 clause 4.8.2.1.3.2, Table 4.8.2.1.3.2-1			
Information Element	Value/Remark	Comment	Condition
RLC-Config-DRB-AM ::= CHOICE {			
am SEQUENCE {			
ul-AM-RLC SEQUENCE {			
t-PollRetransmit	ms200		
}			
}			
}			

## 7.1.2.4 Random access procedure / Successful

### 7.1.2.4.1 Test Purpose (TP)

(1)

```
with { UE in E-UTRA RRC_IDLE state }
ensure that {
  when { The SS pages the UE with a matching identity }
  then { UE transmits a random access preamble in the next available Random Access occasion }
}
```

(2)

```
with { UE in E-UTRA RRC_IDLE state after transmission of a PRACH preamble }
ensure that {
  when { SS does not answer with a matching Random Access Response within ra-ResponseWindowSize }
```