

CELL SELECTION IMPROVEMENTS
TEST PLAN

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Rev 002

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Purpose

This document describes the Test Plan for Cell Selection improvements feature. The Low Level Design document cell_selection_LLD_003.doc is used as reference for deriving the test cases. The Low Level Design document for Cell Selection Improvements feature is attached to the Conquest issue RR_ENH_24888.

2 Scope

This document captures the testing requirements for Cell Selection Improvements feature.

The document is divided into the following sections

PC simulation tests: Describes all new PC simulation test cases

Target Tests: Describes the basic sanity target tests

Interface changes: Describes changes to MPH sap between RR AND ALR

Configurable Parameters: Describes all Dynamic Configuration Commands

Deviations: Describes any deviations taken from HLD.

2.1 Terms and Definitions

Abbreviation/Term

Expansion/Definition

API

Application Programming Interface

ARFCN

Absolute Radio Frequency Channel Number

CQ

Conquest

DCS

Digital Communication System

FFS

Flash File System

PCM

Permanent Configuration Memory

PCS

Personal Communication System

RxLev

Signal Level of a carrier

2.2 References

- [1] Cell_selection_005.doc - High Level Design document for Cell Selection Improvements feature
- [2] Cell_selection_LLD_003.doc - Low Level Design document for Cell Selection Improvements feature

3

PC Simulation Tests

Several new PC simulation test cases in RR and ALR entity have been written to test the code changes implemented as part of Cell selection feature. All the existing test cases have also been modified to work with the new changes.

3.1 RR Entity

3.1.1 Black List

3.1.1.1 RR-2050 Management of black list carriers signal strength more than UPPER_RXLEV_THRESHOLD

Description: The carriers on which MS failed to synchronize and which obeys the black list criteria are added to black list during parallel search.

Precondition: Five cells are configured

Cell

ARFCN

RXLEV

PLMN

A

3

24

-

B

99

23

-

C

612

22

-

D

800

21

-

E

67

20

123/32F

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: Wait for MPH_POWER_REQ primitive from RR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B, C, D and E are injected

Result_2: Synchronization failed on A, B, C and D carriers whose signal strength is more than UPPER_RXLEV_THRESHOLD. So added to black list.

Result_3: System information message containing BA list sent.

Result_4: All the BA list carriers are removed from the black list

3.1.1.2 RR-2051 Management of black list carriers signal strength in between MEDIUM_RXLEV_THRESHOLD and LOWER_RXLEV_THRESHOLD
Description: The carriers on which MS failed to synchronize and signal strength is in between UPPER_RXLEV_THRESHOLD and MEDIUM_RXLEV_THRESHOLD, which obey black list criteria are added to the black list.

Precondition: Five cells are configured

Cell

ARFCN

RXLEV

PLMN

A

3

20

-

B

99

12

-

C

612

11

-

D

800

10

-

E

67

9

122/32F

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: Wait for MPH_POWER_REQ primitive from RR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B, C, D and E are injected

Result_2: Synchronization failed on A, B, C and D carriers.

Synchronization fails for carrier 'A' and signal strength is more than UPPER_RXLEV_THRESHOLD. A is added to black list. For carriers B, C, and D synchronization fails and signal strength is in between UPPER_RXLEV_THRESHOLD and MEDIUM_RXLEV_THRESHOLD. Sync fail counter is incremented for these carriers. Synchronization succeeds for carrier 'E' and this cell belongs to PLMN 122/32

which is not requested PLMN 123/32. So MS reaches No service state.

Action_3: TREG expiry

Result_4: After each TREG expiry RR starts non-parallel search.

Action_2 and Action_3 are repeated for 5 times so that sync fail counter reaches MAX_SYNC_FAILURES. Carriers B,C and D are added to black list

3.1.1.3 RR-2052 Management of black list carriers after successful synchronization in non-parallel search

Description: The carriers on which MS failed to synchronize and which obeys the black list criteria are added to black list during parallel search. Successfully synchronized carriers during non-parallel search are removed from the black list.

Precondition: Five cells are configured

Cell

ARFCN

RXLEV

PLMN

A

3

20

-

B

99

12

-

C

612

11

-

D

800

10

-

E

67

9

122/32F

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: Wait for MPH_POWER_REQ primitive from RR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B, C, D and E are injected

Result_2: Synchronization failed on A, B, C and D carriers.

Synchronization for carrier 'A' failed and signal strength is more than UPPER_RXLEV_THRESHOLD added to black list. For carriers B,C, and D synchronization failed and signal strength is in between UPPER_RXLEV_THRESHOLD and MEDIUM_RXLEV_THRESHOLD sync fail counter is incremented. For carrier 'E' synchronization success

and this cell belongs to PLMN 122/32 which is not requested PLMN 123/32. So MS reaches No service state.
 Action_3: TREG expiry
 Result_4: TREG expiry RR starts non-parallel search.
 Synchronization for carrier 'A ' succeeds and this cell belong to the requested PLMN. So RR reaches full service on this cell.
 Carrier 'A' removed from the black list

3.1.1.4 RR-2053 Management of black list carriers during parallel search

Description: The carriers on which MS failed to synchronize and which obeys the black list criteria are added to black list during parallel search.

Precondition: Three cells are configured

Cell
 ARFCN
 RXLEV
 PLMN
 A
 67
 14
 123/32F
 B
 68
 12
 -
 C
 124
 8
 -

Black List: Erased
 White List: Erased
 STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f
 Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.
 Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected
 Result_2: Synchronization successful on cell A.RR camps on cell A for Full service.
 Action_3: Send RR_ACTIVATE_REQ(Manual search)
 Result_3: RR sends MPH_POWER_REQ primitive to ALR(parallel search)
 Action_4: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected.
 Result_4 RR fails to synchronize to the three carriers so these carriers are added to the black list

3.1.1.5 RR-2053A To erase the black list from RAM dynamic command ERASE_BL

Description: The carriers on which MS failed to synchronize and which obeys the black list criteria are added to black list during

parallel search. These carriers are removed using the dynamic command ERASE_BL command

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

14

123/32F

B

68

12

-

C

124

8

-

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: Synchronization successful on cell A. RR camps on cell A for Full service.

Action_3: Send RR_ACTIVATE_REQ (Manual search)

Result_3: RR sends MPH_POWER_REQ primitive to ALR (parallel search)

Action_4: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_4: RR fails to synchronize to the three carriers so these carriers are added to the black list

Action_4: RR CONFIG ERASE_BL

Result_4: Black list carriers on the RAM are erased.

3.1.1.6 RR-2054 Management of black list carriers during parallel search after successful synchronization

Description: The carriers on which MS able to synchronize are removed from the black list

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

14

123/32F

B

68

12

-

C

124

8

-

Black List: SET_BL= European 67,32,124

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: Synchronization successful on cell A. RR camps on cell A for Full service.

Action_3: Send RR_ACTIVATE_REQ (Manual search)

Result_3: RR sends MPH_POWER_REQ primitive to ALR (parallel search)

Action_4: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_4: RR successfully synchronized to the carriers A, B, C which are part of black list should be removed from black list.

3.1.1.7 RR-2055 Management of black list carriers BA list carriers are not included in black list

Description: To check the white list carriers are not included in black list.

Precondition: Five cells are configured

Cell

ARFCN

RXLEV

PLMN

A

3

20

-

B

99

12

-

C

612

11

-

D

800

10

-

E

67

9

122/32F

White List: SET_WL = European region 3,32,67,99

U_RXT = 10

M_RXT = 8

L_RXT = 5

Black List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: Await for MPH_POWER_REQ primitive from RR. The

Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Five cells A, B,C,D and E are injected

Result_2: Synchronization failed on carriers A, B, C and D. Since carriers A and B are present in white list they should not be added to black list.

3.1.1.8 RR-2056 Synchronization fail counter check for two carriers from the same byte

Description: To test the synchronization fail counter for two carriers from same byte failed to synchronize.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

14

123/32F

B

68

12

-

C

124

8

-

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: Synchronization failure on the three carriers. The synchronization fail counter for the carriers A and B form the same byte incremented correctly.

3.1.1.9 RR-2057 Management of black list carriers all MA list carriers in D_CHAN_ASSIGN are removed from black list

Description: All the MA list carriers in D_CHAN_ASSIGN command are removed from the black list.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

123/32F

B

32

21

-

C

124

20

-

Black List: SET_BL = European region

3,24,67,612,800,976,527,600,1000,124

SET_BL = American region

527,170,200,612,800

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: Wait for MPH_POWER_REQ primitive from RR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: Synchronization successful on cell A.RR camps on cell A for Full service.

Action_3: Send MPH_PAGING_IND.

Result_3: RR connection establishment procedure is executed.

Paging response sent to the network. MS reaches dedicated state.

Action_4: Send DL_DATA_IND with D_CHAN_ASSIGN command with MA list 3,24,99.

Result_4: MA list carriers if present in black are removed. MA list carrier 3 and 24 removed from the black list.

3.1.1.10 RR-2058 Management of black list carriers all MA list carriers in D_FREQ_REDEF are removed from black list

Description: All the MA list carriers in D_FREQ_REDEF command are removed from the black list.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

123/32F

B

32

21

-

C

124

20

-

Black List: SET_BL = European region

3,24,52,82,800,976,527,600,1000,124

SET_BL = American region

527,170,200,612,800

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: Await for MPH_POWER_REQ primitive from RR. The

Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: Synchronization successful on cell A.RR camps on cell A for Full service.

Action_3: Send MPH_PAGING_IND.

Result_3: RR connection establishment procedure is executed.

Paging response sent to the network.MS reaches dedicated state.

Action_4: Send DL_DATA_IND with D_FREQ_REDEF command with MA list 52,82.

Result_4: MA list carriers if present in black are removed. MA list carrier 52 and 82 removed from the black list.

3.1.1.11 RR-2059 Management of black list carriers MS in no service state during power cycles (writing onto FFS and reading from FFS)

Description: For testing black list storage on FFS during power cycles when RR is in No-Service state.

Precondition: Five cells are configured

Cell

ARFCN

RXLEV

PLMN

A

3

20

-

B

99

12

-

C

612

11

-

D

800

10

-

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f
 Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.
 Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected
 Result_2: Synchronization successful on cell A.RR camps on cell A for Full service.
 Action_3: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f
 Result_3: MM requests to camp on a HPLMN.RR camps on a cell A for full service
 Action_4: RR_DEACTIVATE_REQ
 Result_4: RR stores all the black list carriers in the FFS.
 During PS initialization black list carriers will be read from FFS and used in the next power scan.

3.1.2 White List

1 RR 2078 CR_DATA is converted into CS_DATA (WHITE_LIST) in FULL SERVICE
 Description: CR_DATA (neighbor cell description) will be converted and copied into CS_DATA White list structure only when MS enters FULL SERVICE.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

122 32F

B

32

21

122 36F

C

124

20

123 32F

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 122 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.Now

MPH_POWER_REQ will have white list and black list arrays with no carrier information.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: RR scans First carrier (67).

Result_2a: RR Reads the SYSTEM INFORMATION (1,2,3,4) of the carrier 67.

Result_2b: RR finds the FULL SERVICE in carrier 67 and configures the ALR in idle mode with


```

Neighbor cell list.(
NCELLS4_3_32_99_124) .RR converts the Neighbor cell list copied in
CR_DATA to CS_DATA white list structure
Action_3:      Send RR_ACTIVATE_REQ. The requested PLMN ID is
122 32f
Result_3:  RR sends MPH_POWER_REQ primitive to ALR. MPH_POWER_REQ
will have the
Neighbor cell carriers as well as
serving cell carrier in the white list array and empty
Black list carrier Array.

```

3.1.2.2 RR 2079 White List carriers written to FFS while switching OFF the MS and read it back when switched ON.
Description: White list carriers written to FFS while switching OFF the MS and Read it back when switched ON

Precondition: Three cells are configured
Cell

ARFCN

RXLEV

PLMN

A

67

22

123 32F

B

32

21

122 36F

C

124

20

122 32F

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850. Now

MPH_POWER_REQ will have white list and black list arrays with no carrier information.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: RR scans First carrier (67).

Result_2a: RR Reads the SYSTEM INFORMATION (1,2,3,4) of the carrier 67.

Result_2b: RR finds the FULL SERVICE in carrier 67 and configures the ALR in idle mode with

```

Neighbor cell list (NCELLS3_3_32_99) .RR
converts the Neighbor cell list copied in

```

```

CR_DATA to CS_DATA white list structure

```

Action_3: Send RR_DEACTIVATE_REQ.

Result_3: MS is switched OFF and white list carriers are written into FFS.

Action_4: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_4: RR sends MPH_POWER_REQ primitive to ALR. MPH_POWER_REQ will have the

Neighbor cell carriers as well as
serving cell carrier in the white list array and empty
Black list carrier Array.

Action_5: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_5: RR scans First carrier (67).

Result_5a: RR Reads the SYSTEM INFORMATION (1,2,3,4) of the carrier 67.

Result_5b: RR finds the FULL SERVICE in carrier 67 and configures the ALR in idle mode with

. Neighbor cell list (NCELLS3_3_32_99) .RR converts the Neighbor cell list copied in

CR_DATA to CS_DATA white list structure
Action_6: Erase the stored white List carriers through configuration command

RR CONFIG ERASE_WL and send
RR_DEACTIVATE_REQ.

Result_6: Stored white list carriers are erased and MS is switched OFF

Action_7: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_7: RR sends MPH_POWER_REQ primitive to ALR.

MPH_POWER_REQ will have the

Empty White List and black list carrier arrays.

3.1.2.3 RR 2500F RR is in FULL SERVICE and Detected Change of system

information.

Description: RR is in FULL SERVICE and system information has changed. The changed System information has to be updated in the white List carrier array.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

122 32F

B

32

21

122 36F

C

124

20

123 32F

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 122 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850. Now MPH_POWER_REQ will have white list and black list arrays with no carrier information.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: RR scans First carrier (67).

Result_2a: RR Reads the SYSTEM INFORMATION (1,2,3,4) of the carrier 67.

Result_2b: RR finds the FULL SERVICE in carrier 67 and configures the ALR in idle mode with

Neighbor cell list.(

NCELLS4_3_32_99_124) .RR converts the Neighbor cell list copied in CR_DATA to CS_DATA white list structure

Action_3: Inject new or changed system information

Result_3: RR reads the changed system information (NCELLS4_21_22_23_24) and updates the white list carriers and sent to ALR.

Action_4: Send RR_ACTIVATE_REQ. The requested PLMN ID is 122 32f

Result_4: RR sends MPH_POWER_REQ primitive to ALR. MPH_POWER_REQ will have the

Changed / Updated Neighbor cell carriers as well as serving cell carrier in the white list array and empty Black list carrier list.

3.1.2.5 RR 2500H White List information copied only in FULL SERVICE

Description: CR_DATA neighbor cell information should be copied in White List only in FULL

SERVICE

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

122 32F

B

32

21

122 36F

C

124

20

123 32F

Black List: Erased

White List: Erased

OP_MODE: EMPTY.

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 122 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850. Now

MPH_POWER_REQ will have white list and black list arrays with no carrier information.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: RR scans First carrier (67).

Result_2a: RR Reads the SYSTEM INFORMATION (1,2,3,4) of the carrier 67.

Result_2b: RR does not find the FULL SERVICE in carrier 67 since no SIM is available. . So Neighbor cell list.(NCELLS4_3_32_99_124) will not be copied into CS_WHITE_LIST carrier list and it will be empty.

Action_3: Send RR_ACTIVATE_REQ. The requested PLMN ID is 122 32f

Result_3: RR sends MPH_POWER_REQ primitive to ALR. MPH_POWER_REQ will not have any Neighbor cell carriers as well as serving cell carrier. All the carriers in the white list array and Black list carrier list will be zero.

3.1.3 New Search Modes

3.1.3.1 RR-2062 Management of search modes in dedicated mode radio link failure

Description: Search mode management during the MS is in Dedicated Mode and "Radio Link Failure" or "Data Link Failure". A Cell Reselection is started and fails. During NORMAL_SEARCH mode it finds a suitable cell for full service .So it stops TREG and T_NORMAL_CS timers.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

123/32F

B

32

21

-

C

124

20

-

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: Wait for MPH_POWER_REQ primitive from RR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: Synchronization successful on cell A.RR camps on cell A for Full service.
 Action_3: Send MPH_PAGING_IND.
 Result_3: RR connection establishment procedure is executed. MS reaches dedicated state.
 Action_4: Send MPH_ERROR_IND.
 Result_4: Starts cell reselection BACK_FROM_DEDICATED_RLF starts and fails to reselect. Then RR starts cell reselection BACK_FROM_DEDICATED starts and fails to reselect. RR starts the non-parallel search with search mode as FAST_SEARCH_MODE and starts TREG and TFAST_CS timers.
 Action_5: TREG expiry.
 Result_5: RR starts non-parallel search with search mode as FAST_SEARCH_MODE till the T_FAST_CS timer is active.
 Action_6: T_FAST_CS expiry.
 Result_6: RR starts non-parallel search with search mode as NORMAL_SEARCH_MODE and starts T_NORAML_CS timer. Here RR finds a suitable cell in NORAML search mode so it stops the timers T_NORMAL_CS and TREG.

3.1.3.2 RR-2063 Management of search modes in dedicated mode radio link failure all search mode transitions

Description: Search mode management during the MS is in Dedicated Mode and "Radio Link Failure" or "Data Link Failure". A Cell Reselection is started and fails. To test the all the search mode transitions.

Precondition: Three cells are configured

Cell
 ARFCN
 RXLEV
 PLMN
 A
 67
 22
 123/32F
 B
 32
 21
 -
 C
 124
 20
 -

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f
 Result_1: Wait for MPH_POWER_REQ primitive from RR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.
 Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected
 Result_2: Synchronization successful on cell A.RR camps on cell A for Full service.

Action_3: Send MPH_PAGING_IND.
 Result_3: RR connection establishment procedure is executed. MS reaches dedicated state.
 Action_4: Send MPH_ERROR_IND.
 Result_4: Starts cell reselection BACK_FROM_DEDICATED_RLF starts and fails to reselect. Then RR starts cell reselection BACK_FROM_DEDICATED starts and fails to reselect. RR starts the non-parallel search with search mode as FAST_SEARCH_MODE and starts TREG and TFAST_CS timers.
 Action_5: TREG expiry.
 Result_5: RR starts non-parallel search with search mode as FAST_SEARCH_MODE till the T_FAST_CS timer is active.
 Action_6: T_FAST_CS expiry.
 Result_6: RR starts non-parallel search with search mode as NORMAL_SEARCH_MODE and starts T_NORAML_CS timer.
 Action_7: T_NORMAL_CS expiry.
 Result_7: RR starts non-parallel search with search mode as FULL_SEARCH_MODE. Only one attempt of FULL_SEARCH_MODE, after the TREG expiry RR starts the NORMAL_SEARCH_MODE
 3.1.3.3 RR-2064 Management of search modes in dedicated mode radio link failure disabling TFAST_CS timer through dynamic command
 Description: Search mode management during the MS is in Dedicated Mode and "Radio Link Failure" or "Data Link Failure". A Cell Reselection is started and fails. During T_FAST_CS timer is active through the dynamic command T_FAST_CS timer is deactivated and tests the next search started is NORMAL search or not.
 Precondition: Three cells are configured
 Cell
 ARFCN
 RXLEV
 PLMN
 A
 67
 22
 123/32F
 B
 32
 21
 -
 C
 124
 20
 -
 Black List: Erased
 White List: Erased
 STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

 Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f
 Result_1: Await for MPH_POWER_REQ primitive from RR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.
 Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected
 Result_2: Synchronization successful on cell A.RR camps on cell A for Full service.

Action_3: Send MPH_PAGING_IND.
 Result_3: RR connection establishment procedure is executed. MS reaches dedicated state.
 Action_4: Send MPH_ERROR_IND.
 Result_4: Starts cell reselection BACK_FROM_DEDICATED_RLF starts and fails to reslect. Then RR starts cell reselection BACK_FROM_DEDICATED starts and fails to reselect. RR starts the non-parallel search with search mode as FAST_SEARCH_MODE and starts TREG and TFAST_CS timers.
 Action_5: TREG expiry.
 Result_5: RR starts non-parallel search with search mode as FAST_SEARCH_MODE. Through the dynamic command T_FAST_CS timer is disabled. RR should start the non-parallel search in NORMAL search mode after the expiry of TREG timer.

3.1.3.4 RR-2065 Management of search modes in dedicated mode radio link failure disabling TFAST_CS and T_NORAML_CS timers through dynamic command

Description: Search mode management during the MS is in Dedicated Mode and "Radio Link Failure" or "Data Link Failure". A Cell Reselection is started and fails. During T_NORMAL_CS timer is active through the dynamic command T_NORMAL_CS timer is deactivated and tests the next search started is FULL search or not.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

123/32F

B

32

21

-

C

124

20

-

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f
 Result_1: Await for MPH_POWER_REQ primitive from RR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.
 Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected
 Result_2: Synchronization successful on cell A. RR camps on cell A for Full service.
 Action_3: Send MPH_PAGING_IND.

Result_3: RR connection establishment procedure is executed. MS reaches dedicated state.
 Action_4: Send MPH_ERROR_IND.
 Result_4: Starts cell reselection BACK_FROM_DEDICATED_RLF starts and fails to reslect. Then RR starts cell reselection BACK_FROM_DEDICATED starts and fails to reselect. RR starts the non-parallel search with search mode as NORMAL_SEARCH_MODE and starts TREG and TNORMAL_CS timers.
 Action_5: TREG expiry.
 Result_5: RR starts non-parallel search with search mode as NORMAL_SEARCH_MODE. Through the dynamic command T_NORMAL_CS timer is disabled. RR should start the non-parallel search in FULL search mode after the expiry of TREG timer.

3.1.3.5 RR-2066 Management of search modes in dedicated mode for more than 30 secs and Normal release of dedicated connection
 Description: Search mode management during the MS is in Dedicated Mode for more than 30 secs and the normal release of the dedicated connection RR starts cell reselection.

Precondition: Three cells are configured

Cell
 ARFCN
 RXLEV
 PLMN
 A
 67
 22
 123/32F
 B
 32
 21
 -
 C
 124
 20
 -

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f
 Result_1: Await for MPH_POWER_REQ primitive from RR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.
 Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected
 Result_2: Synchronization successful on cell A. RR camps on cell A for Full service.
 Action_3: Send MPH_PAGING_IND.
 Result_3: RR connection establishment procedure is executed. MS reaches dedicated state. MS is in dedicated state for more than 30 secs.
 Action_4: send CHAN_RELEASE message

Result_4: RR releases the channel and try to reselect the cell. RR fails to reselect the cell. The RR starts the non-parallel search with search mode as NORMAL_SEARCH.

3.1.3.6 RR-2067 Management of search modes in dedicated mode radio link failure reselect timer expiry

Description: This test case is for testing search mode management during the MS is in Dedicated Mode and "Radio Link Failure" or "Data Link Failure". A Cell Reselection is started and fails. This test case covers the scenario where T_RESELECT timer expiry and starts non-parallel search mode.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

123/32F

B

32

21

-

C

124

20

-

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: Await for MPH_POWER_REQ primitive from RR. The

Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: Synchronization successful on cell A. RR camps on cell A for Full service.

Action_3: Send MPH_PAGING_IND.

Result_3: RR connection establishment procedure is executed. MS reaches dedicated state.

Action_4: Send MPH_ERROR_IND.

Result_4: Starts cell reselection BACK_FROM_DEDICATED_RLF starts and fails to reslect. Then RR starts cell reselection

BACK_FROM_DEDICATED starts and fails to reselect.

Action_5: T_RESELECT timer expiry.

Result_5: RR starts non-parallel search with search mode as FAST_SEARCH_MODE.

3.1.3.7 RR-2068 Management of search modes in limited service idle mode radio link failure requested MM service is FULL service

Description: Search mode management during MS is in limited idle service (but the MM requested service is FULL) and Radio link failure causes to start non-parallel search.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

123/32F

B

32

21

-

C

124

20

-

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: RR scans all the three carriers (67, 32, 124 in that order) during First Scan First Attempt

Action_3: There are no cells during First Scan Second Attempt

Result_3: RR scans only Cell B (32) during Second scan. It reaches Limited Service on Cell B.

Action_4: Send MPH_ERROR_IND.

Result_4: Starts non-parallel cell selection with search mode as NORMAL_SEARCH_MODE

3.1.3.8 RR-2069 Management of search modes in full service idle mode radio link failure

Description: Search mode management during MS is in FULL idle service (but the MM requested service is FULL) and Radio link failure causes to start non-parallel search.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

123/32F

B

32

21

-

C

124

20

-

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: Synchronization successful on cell A. RR camps on cell A for Full service.

Action_3: Send MPH_ERROR_IND.

Result_4: Starts non-parallel cell selection with search mode as FAST_SEARCH_MODE

3.1.3.9 RR-2070 Management of search modes in limited service idle mode radio link failure requested MM service is limited service

Description: Search mode management during MS is in FULL idle service (but the MM requested service is LIMITED) and Radio link failure causes to start non-parallel search.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

123/32F

B

32

21

-

C

124

20

-

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: Synchronization failure on cell A. Unreadable BCCH messages. Successfully synchronized to carrier B for limited service.
Action_3: Send MPH_ERROR_IND.
Result_4: Starts non-parallel cell selection with search mode as NORMAL_SEARCH_MODE

3.1.3.10 RR-2071 Management of search modes in limited service idle mode TREG timer expiry MM requested service is FULL service

Description: Search mode management during MS is in FULL idle service (but the MM requested service is FULL) and TREG expiry causes RR to start parallel search.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

123/32F

B

32

21

-

C

124

20

-

Black List: Erased

White List: Erased

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: RR scans all the three carriers (67, 32, 124 in that order) during First Scan First Attempt

Action_3: There are no cells during First Scan Second Attempt

Result_3: RR scans only Cell B (32) during Second scan. It reaches Limited Service on Cell B.

Action_4: TREG timer expiry

Result_4: RR starts parallel search in NORMAL search mode.

3.1.3.11 RR-2072 Management of search modes in no service idle

TREG timer expiry MM requested service is FULL service

Description: Search mode management during MS is in no service (but the MM requested service is FULL) and TREG expiry causes RR to start parallel search.

Precondition: Five cells are configured

```

Cell
ARFCN
RXLEV
PLMN
A
3
20
-
B
99
12
-
C
612
11
-
D
800
10
-
E
67
9
122/32F
Black List:          Erased
White List: Erased
STD      :      33 (P-GSM, E-GSM, 1800, 1900, 850)

```

```

Action_1:  Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f
Result_1:  RR sends MPH_POWER_REQ primitive to ALR. The Frequency
bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.
Action_2:  Inject MPH_POWER_CNF primitive. Five cells A, B ,C,D
and E are injected
Result_2:  Synchronization failures on the carriers A,B,C and
D.Synchronisation successful on D but      the carrier D belongs to
other than requested plmn .RR reaches No service starts TREG
timer.
Action_3:  TREG timer expiry
Result_3:  RR starts parallel search in NORMAL search mode.

```

3.1.3.12 RR-2073 Reasonably strong carriers should be used in FAST search mode

Description: To test the RR uses only the reasonably strong carriers in the FAST search mode.

Precondition: Three cells are configured

```

Cell
ARFCN
RXLEV
PLMN
A
3
24
-
B

```

32
23

-
C
99
22

D
612
21

E
527
12

F
800
11

G
124
10

-
Black List: Erased
White List: Erased
RX_THRES U_RXT = 30
 M_RXT = 20
 L_RXT = 10

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f
Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency
bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.
Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C
are injected
Result_2: Synchronization successful on cell A.RR camps on cell A
for Full service.
Action_3: Send MPH_PAGING_IND.
Result_3: RR connection establishment procedure is executed. MS
reaches dedicated state.
Action_4: Send MPH_ERROR_IND.
Result_4: Starts cell reselection BACK_FROM_DEDICATED_RLF starts
and fails to reslect.Then RR starts cell reselection
BACK_FROM_DEDICATED starts and fails to reselect.RR starts non-
parallel search in FAST_SEARCH_MODE.
Action_5: Inject MPH_POWER_CNF primitive. Seven cells A, B
,C,D,E,F and G are injected
Result_5: RR selects cells A,B,C and D which are reasonably
strong carriers.

3.1.3.13 RR 2083 Black List Search will not be started if there
are no Black list carriers present.

Description: Black list search will not be started if there are no carriers present in the black list array.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

123 32F

B

32

21

122 36F

C

124

20

122 32F

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850. Now MPH_POWER_REQ will have white list and black list arrays with no carrier information.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: RR scans First carrier (67).

Result_2a: RR Reads the SYSTEM INFORMATION (1,2,3,4) of the carrier 67.

Result_2b: RR finds the FULL SERVICE in carrier 67 and configures the ALR in idle mode with

. Neighbor cell list.(NCELLS3_3_32_99)

.RR converts the Neighbor cell list copied in

CR_DATA to CS_DATA white list structure

Action_3: Reduce the signal strength level of the Serving cell 67 and increase the signal strength

Level on neighbor cell 3(belongs to another location)

Result_3: RR will reselect the cell 3, which belongs to another location area, reads the system

Information, neighbor cell list (NCELLS4_21_22_23_24) and camp on with full service.

Action_4: Send RR_EST_REQ and RR will make a dedicated connection and Leave dedicated.

Result_4: RR will go to dedicated state, leave from dedicated and stay in idle mode and will not

Start black list search since there are no black list carriers stored in the black list array.

3.1.3.14 RR 2500B- Black List Search dropped not when RR receives RR_EST_REQ during Black list search

Description: Black list search will not be started if there are no carriers present in the black list array.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

123 32F

B

32

21

122 36F

C

124

20

122 32F

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850. Now MPH_POWER_REQ will have white list and black list arrays with no carrier information.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: RR scans First carrier (67).

Result_2a: RR Reads the SYSTEM INFORMATION (1,2,3,4) of the carrier 67.

Result_2b: RR finds the FULL SERVICE in carrier 67 and configures the ALR in idle mode with

. Neighbor cell list.(NCELLS3_3_32_99)

.RR converts the Neighbor cell list copied in

CR_DATA to CS_DATA white list structure

Action_3: Add 5 Black list carriers (0,1,7,8,9) through configuration command. And Reduce

the signal strength level of the Serving cell 67 and increase the signal strength

Level on neighbor cell 3(belongs to another location)

Result_3: RR will reselect the cell 3, which belongs to another location area, reads the system

Information, neighbor cell list (NCELLS4_21_22_23_24) and camp on with full service.

and Black list carriers will be added in the Black list carrier array.

Action_4: Send RR_EST_REQ and RR will make a dedicated connection and Leave dedicated.

Result_4: RR will go to dedicated state, leave from dedicated and stay in idle mode and will

Start black list search since there are black list carriers stored in the black list array.

Action_5: Send RR_ESTABLISH_REQ to establish a call during black list search is active.

Result_5: Black List search will be dropped and
RR_ESTABLISH_REQ will be handled to
establish a call.

3.1.3.15 RR 2085-Inactive Black List carriers Removed from the Black List

Description: Inactive Black list carriers will be removed from the Black List carrier array.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

8

20

B

10

18

C

16

14

D

128

11

E

67

22

122 32F

F

32

21

122 36F

G

124

20

123 32F

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 122 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850. Now MPH_POWER_REQ will have white list and black list arrays with no carrier information.

Action_2: Inject MPH_POWER_CNF primitive. Four cells A, B, C, D are injected.

Result_2: RR scans none of the scanned (8,10,16,128) and informs MM about cell selection failed and these black list carriers (8,10,16) are stored in black list arrays and Carrier 128 will not added since it is a grey carrier.

Action_3: Send RR_ACTIVATE_REQ. The requested PLMN ID is 122 32f

Result_3: RR sends MPH_POWER_REQ primitive to ALR. Now MPH_POWER_REQ will have empty white list array and stored black list arrays information.

Action_4: Inject MPH_POWER_CNF primitive. Three cells E, F and G are injected and Inactive black list carrier 10 will also be sent.

Result_4: RR scans First carrier (67).

Result_4a: RR Reads the SYSTEM INFORMATION (1,2,3,4) of the carrier 67.

Result_4b: RR finds the FULL SERVICE in carrier 67 and configures the ALR in idle mode with

. Neighbor cell list (NCELLS4_3_32_99_124)

.RR converts the Neighbor cell list copied in CR_DATA to CS_DATA white list structure

Action_5: Send RR_ACTIVATE_REQ. The requested PLMN ID is 122 32f.

Result_5 RR sends MPH_POWER_REQ primitive to ALR. This power request will have White list (SC - 67, NCELLS4_3_32_99_124,inactive black list carrier 10) and black list carrier array

3.1.3.16 RR 2500D- Grey carriers are added to black list

Description: Grey carriers are added to the black list array.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

8

20

B

10

18

C

16

14

D

128

11

E

67

22

122 32F

F

32

21
122 36F
G
124
20
123 32F

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)
Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 122 32f
Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850. Now MPH_POWER_REQ will have white list and black list arrays with no carrier information.
Action_2: Inject MPH_POWER_CNF primitive. Four cells A, B, C, D are injected.
Result_2: RR scans none of the scanned (8,10,16,128) and informs MM about cell selection failed and these black list carriers (8,10,16) are stored in black list arrays.
Action_3: Send RR_ACTIVATE_REQ. The requested PLMN ID is 122 32f
Result_3: RR sends MPH_POWER_REQ primitive to ALR. Now MPH_POWER_REQ will have empty white list array and stored black list arrays information.
Action_4: Inject MPH_POWER_CNF primitive. Three cells E, F and G are injected
Result_4: RR scans First carrier (67).
Result_4a: RR Reads the SYSTEM INFORMATION (1,2,3,4) of the carrier 67.
Result_4b: RR finds the FULL SERVICE in carrier 67 and configures the ALR in idle mode with
Neighbor cell list (NCELLS4_3_32_99_124)
.RR converts the Neighbor cell list copied
CR_DATA to CS_DATA white list structure.
Action_5: Reduce the signal strength level of the Serving cell 67 and increase the signal strength
Level on neighbor cell 3(belongs to another location)
Result_5: RR will reselect the cell 3, which belongs to another location area, reads the system
Information, neighbor cell list (NCELLS3_3_32_99) and camp on with full service.
Action_6: Send RR_EST_REQ and RR will make a dedicated connection and Leave dedicated.
Result_6: RR will go to dedicated state, leave from dedicated and stay in idle mode and will
Start black list search since there are black list carriers stored in the black list array.
Since it is black list search, Grey carrier(128) will also be included in the black list array for black list search.

3.1.3.17 RR 2500I - Forced Black List Search when MS is in IDLE State

Description:

Precondition: Seven cells are configured

Cell

ARFCN

RXLEV

PLMN

A

8

20

B

10

18

C

16

14

D

128

11

E

67

22

122 32F

F

32

21

122 36F

G

124

20

123 32F

RR CONFIG FBLS = 1 (Forced Black List Search)

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 122 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850. Now

MPH_POWER_REQ will have white list and black list arrays with no carrier information.

Action_2: Inject MPH_POWER_CNF primitive. Four cells A, B, C and D are injected

Result_2: RR scans none of the scanned (8,10,16,128) and informs MM about cell selection failed and these black list carriers (8,10,16) are stored in black list arrays.

Action_3: Send RR_ACTIVATE_REQ. The requested PLMN ID is 122 32f

zResult_3: RR sends MPH_POWER_REQ primitive to ALR

Action_4: Inject MPH_POWER_CNF primitive. 3 cells E, F and G are injected

Result_4: RR scans First carrier (67).

Result_4a: RR Reads the SYSTEM INFORMATION (1,2,3,4) of the carrier 67.

Result_4b: RR finds the FULL SERVICE in carrier 67 and configures the ALR in idle mode with

. Neighbor cell list (NCELLS4_3_32_99_124)
.RR converts the Neighbor cell list copied in

CR_DATA to CS_DATA white list structure
Action_5: Set the Command RR CONFIG FBLS = 1 to start the forced Black List search and Send

RR_ACTIVATE_REQ with PLMN ID 122 32f

Result_5: RR sends MPH_POWER_REQ to start the black list carrier. Here only Added Black

List carries and Grey carriers will be filled and white list will be zero since it is a Black list search.

3.1.3.18 3.1.1.6 RR 2500J Disabling BL_CS. Black List search should not start

Description: BL_CS command is disabled. Black List search Should not start.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

PLMN

A

67

22

122 32F

B

32

21

122 36F

C

124

20

123 32F

SET BL_CS = 0.

SET_BL = 0,1,7,8,9

STD : 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 122 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850. Now

MPH_POWER_REQ will have white list and black list arrays with no carrier information.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: RR scans First carrier (67).

Result_2a: RR Reads the SYSTEM INFORMATION (1,2,3,4) of the carrier 67.

Result_2b: RR finds the FULL SERVICE in carrier 67 and configures the ALR in idle mode with

. Neighbor cell list (NCELLS3_3_32_99) .RR converts the Neighbor cell list copied in

CR_DATA to CS_DATA white list structure

Action_3: Set the Black List carriers 0,1,7,8,9 through command CONFIG RR SET_BL and Reduce the signal strength level of the Serving cell 67 and increase the signal strength Level on neighbor cell 3(belongs to another location)
 Result_3: RR will reselect the cell 3, which belongs to another location area, reads the system Information, neighbor cell list (NCELLS4_21_22_23_24) and camp on with full service.
 Action_4: Send RR_EST_REQ and RR will make a dedicated connection and Leave dedicated.
 Result_4: RR will go to dedicated state, leave from dedicated and stay in idle mode and will not Start black list search and stay in idle mode since black list search is disabled through the command BL_CS = 0.

3.1.4 Region Selection Problem

3.1.4.1 RR-2089 Region Selection

Description: This test case tests the "Region Selection problem" in Limited Service. Following TREG timer expiry in Limited Service, if the MS had synchronized to both American and European channels, it starts Non-Parallel search. The time gap between two successive Non-Parallel searches is by default restricted to 2minutes. It shall use Parallel search otherwise.

Precondition: Two cells are configured

Cell

ARFCN

RXLEV

CBQ

CBA

PLMN

Region

A

67

22

0

1

123 32F

European

B

32

21

0

0

122 36F

American

Black List: Erased

White List: Erased

STD: 33 (P-GSM, E-GSM, 1800, 1900, 850)

NPS_DELAY NPS_DELAY is set to 20 seconds

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.
Action_2: Inject MPH_POWER_CNF primitive. Two cells A and B are injected
Result_2: RR scans all the three carriers (67, 32 in that order) during First Scan First Attempt
Result_3: No cells available for First Scan Second Attempt
Result_4: RR scans only Cell B (32) during Second scan. It reaches Limited Service on Cell B.
Result_5: TREG timer is started and expires after 10seconds. RR starts Parallel search. Full service is not found
Result_6: TREG is started again and expires after 10 seconds. RR starts Non-Parallel search.

3.1.5 BA list and Last Used Serving Cell storage and usage

3.1.6 Multiple requests from MM during Cell selection

3.1.7 Frequent searching of carriers during 2 Scans

3.1.7.1 RR-2075 MS enters Limited Service during Second Scan

Description: MS does not find suitable cells during First Scan First Attempt and First Scan Second Attempt. It enters Limited service during Second scan.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

CBQ

CBA

PLMN

Cell selection

A

67

22

0

1

123 32F

BARRED

B

32

21

0

0

122 36F

NORMAL

C

124

20

1

0

123 32F

LOW

Black List: Erased

White List: Erased

STD: 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f
 Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.
 Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected
 Result_2: RR scans all the three carriers (67, 32, 124 in that order) during First Scan First Attempt
 Result_3: RR scans only Cell C (124) during First Scan Second Attempt
 Result_4: RR scans only Cell B (32) during Second scan. It reaches Limited Service on Cell B.

3.1.7.2 RR-2076 Limited service, all low priority, different PLMN
 Description: This test case tests the "Searching of carriers during 2 Scans" changes. All the cells belong to a different PLMN and are also low priority cells. RR directly starts second scan after First attempt and enters Limited service

Precondition: Three cells are configured

Cell
 ARFCN
 RXLEV
 CBQ
 CBA
 PLMN
 Cell selection

A
 67
 22
 1
 0
 122 36F
 LOW
 B
 32
 21
 1
 0
 122 36F
 LOW
 C
 124
 20
 1
 0
 122 36F
 LOW

Black List: Erased

White List: Erased

STD: 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f
 Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected
Result_2: RR scans all the three carriers (67, 32, 124 in that order) during First Scan First Attempt
Result_3: RR does not scan any cell during First Scan Second Attempt
Result_4: RR scans Cell A (67) during Second scan. It reaches Limited Service on Cell A.

3.1.7.3 RR-2077 Full service during second attempt

Description This test case tests the "Searching of carriers during 2 Scans" changes. All the cells belong to requested PLMN but are low priority cells. RR directly starts second attempt after First attempt and enters Full service.

Precondition: Three cells are configured

Cell

ARFCN

RXLEV

CBQ

CBA

PLMN

Cell selection

A

67

22

1

0

123 32F

LOW

B

32

21

1

0

123 32F

LOW

C

124

20

1

0

123 32F

LOW

Black List: Erased

White List: Erased

STD: 33 (P-GSM, E-GSM, 1800, 1900, 850)

Action_1: Send RR_ACTIVATE_REQ. The requested PLMN ID is 123 32f

Result_1: RR sends MPH_POWER_REQ primitive to ALR. The Frequency bands supported are P-GSM, E-GSM, 1800, 1900 AND 850.

Action_2: Inject MPH_POWER_CNF primitive. Three cells A, B and C are injected

Result_2: RR scans all the three carriers (67, 32, 124 in that order) during First Scan First Attempt

Result_3: RR starts First Scan Second Attempt. It starts with cell A.

Result_4: It reaches Full Service on Cell A.

3.2 ALR Entity

This section describes all the ALR PC simulation entity test cases added to test cell selection improvements feature

3.2.1 Power Measurement

3.2.1.1 Rxlevel Measurement validation based on search mode

Description:

ALR has to decide number of attempts for the power level measurement based on search mode. The following test cases are to test the behavior of the ALR power measurement attempts based on the search mode.

3.2.1.1.1 ALR9806A FULL SEARH MODE

Precondition

White list: NO_CARRIERS

White list Region: EUROPEAN_REGION

Black list Euro: NO_CARRIERS

Black list AMR: NO_CARRIERS

L1 Power Result [Euro/ Amr]: RXLEV_IDX_2

Action_1: Send a MPH_POWER_REQ primitive to ALR with the search mode as FULL_SEARH_MODE.

Result_1: Layer 1 should receive the MPHC_RXLEV_REQ primitive five times to measure the power level.

3.2.1.1.2 ALR9806B NORMAL SEARH MODE

Precondition

White list: NO_CARRIERS

White list Region: EUROPEAN_REGION

Black list Euro: NO_CARRIERS

Black list AMR: NO_CARRIERS

L1 Power Result [Euro/ Amr]: RXLEV_IDX_2

Action_1: Send a MPH_POWER_REQ primitive to ALR with the search mode as

NORMAL_SEARH_MODE

Result_1: Layer 1 should receive the MPHC_RXLEV_REQ primitive five times to measure the power level.

3.2.1.1.3 ALR9806C FAST SEARH MODE

Precondition

White list: NO_CARRIERS

White list Region: EUROPEAN_REGION

Black list Euro: NO_CARRIERS

Black list AMR: NO_CARRIERS

L1 Power Result [Euro/ Amr]: RXLEV_IDX_2

Action_1: Send a MPH_POWER_REQ primitive to ALR with the search mode as FAST_SEARH_MODE

Result_1: Layer 1 should receive the MPHC_RXLEV_REQ primitive only once to measure the power level.

3.2.1.1.4 ALR9806D BLACK LIST SEARH MODE

Precondition

White list: NO_CARRIERS

White list Region: EUROPEAN_REGION
Black list Euro: LIST_1024_1023_10_20_amr
Black list AMR: NO_CARRIERS
L1 Power Result [Euro/ Amr]: RXLEV_IDX_7
Action_1: Send a MPH_POWER_REQ primitive to ALR with the search mode as

BLACK_LIST_SEARH_MODE

Result_1: Layer 1 should receive the MPH_POWER_REQ primitive only once to measure the power level.

3.2.2 Black List and Inactive Carriers

Description

Black list carriers reported by the RR will not participate in the MPH_POWER_CNF primitive if the search mode is other than FULL SEARCH. In case of FULL SEARCH the blacklist will not be considered during the preparation of MPH_POWER_CNF, and the entire carriers more than the LOWER_THRESHOLD will be reported to RR. The following test cases are to test the behavior of the ALR when the RR provides black list carriers.

3.2.2.1.1 ALR9808 Black list and Inactive carriers

Scenario 1 - Inactive Carriers

Precondition

White list: NO_CARRIERS
White list Region: EUROPEAN_REGION
Black list Euro: LIST_1024_1023_10_20_amr
Black list AMR: NO_CARRIERS
L1 Power Result [Euro/ Amr]: RXLEV_IDX_7
Action_1: Send a MPH_POWER_REQ primitive to ALR with the search mode as

NORMAL_SEARH_MODE and send some carriers as black list carriers to the ALR.

Result_1: Blacklist carriers reported by RR shall not be considered during preparation of MPH_POWER_CNF irrespective of the rxlevel. The remaining carriers that has more than

LOWER_RXLEV_THRESHOLD may only be considered.

Scenario 2 - NORMAL SEARH MODE

White list: LIST_1_14_euro
White list Region: EUROPEAN_REGION
Black list Euro: LIST_1_14_euro
Black list AMR: NO_CARRIERS
L1 Power Result [Euro/ Amr]: RXLEV_IDX_1
Action_2: Send a MPH_POWER_REQ primitive to ALR with the search mode as FAST_SEARH_MODE

and send some carriers as black list carriers to the ALR.

Result_2: Blacklist carriers reported by RR shall not be considered during preparation of MPH_POWER_CNF irrespective of the rxlevel. The remaining carriers that has more than

LOWER_RXLEV_THRESHOLD may only be considered

(ARFCN_23_STD_EGSM,
ARFCN_150_STD_DUAL_US, ARFCN_140_STD_DUAL_US,
ARFCN_124_STD_EGSM,
ARFCN_250_STD_DUAL_US, ARFCN_130_STD_DUAL_US).

Scenario - FAST SEARH MODE

Precondition

White list: LIST_1_14_euro

White list Region: EUROPEAN_REGION

Black list Euro: LIST_1_14_euro

Black list AMR: NO_CARRIERS

L1 Power Result [Euro/ Amr]: RXLEV_IDX_1

Action_3: Send a MPH_POWER_REQ primitive to ALR with the search mode as FAST_SEARH_MODE

and send some carriers as black list carriers to the ALR.

Result_3: Blacklist carriers reported by RR shall not be considered during preparation of

MPH_POWER_CNF irrespective of the rxlevel. The remaining carriers that has more than

LOWER_RXLEV_THRESHOLD may only be considered (ARFCN_23_STD_EGSM, ARFCN_150_STD_DUAL_US, ARFCN_140_STD_DUAL_US, ARFCN_124_STD_EGSM, ARFCN_250_STD_DUAL_US, ARFCN_130_STD_DUAL_US).

Scenario 4 - BLACK LIST SEARH MODE

Precondition

White list: LIST_1_14_euro

White list Region: EUROPEAN_REGION

Black list Euro: LIST_975_euro

Black list AMR: NO_CARRIERS

L1 Power Result [Euro/ Amr]: RXLEV_IDX_7

Action_4: Send a MPH_POWER_REQ primitive to ALR with the search mode as

BLACK_LIST_SEARH_MODE and some carriers as black list carriers to the ALR.

Result_4: Only the carriers that are provided by the RR as blacklist will be measured. ALR will report in

MPH_POWER_CNF as inactive carriers if the power level is less than

LOWER_RXLEV_THRESHOLD (LIST_975_euro).

Scenario 5 - FULL SEARH MODE

Precondition

White list: NO_CARRIERS

White list Region: EUROPEAN_REGION

Black list Euro: LIST_1024_1023_10_20_amr

Black list AMR: NO_CARRIERS

L1 Power Result [Euro/ Amr]: RXLEV_IDX_7

Action_5: Send a MPH_POWER_REQ primitive to ALR with the search mode as FULL_SEARH_MODE

and some carriers as black list carriers to the ALR.

Result_5: All the carriers that have power level more than LOWER_RXLEV_THRESHOLD will be re

ported to RR as inactive carriers by the ALR. The black list carriers provided by the RR shall

not be considered in case of FULL_SEARCH_MODE and these carriers will do participate in

MPH_POWER_CNF. (ARFCN_1023_STD_900, ARFCN_1024_STD_900,

ARFCN_0_STD_900, ARFCN_974_STD_900,
ARFCN_124_STD_900,
ARFCN_123_STD_900, ARFCN_20_STD_900,
ARFCN_10_STD_900)
3.2.2.1.2 Scenario 6 - Same carriers in Black list and other
region white list
Precondition
White list: LIST_1_14_euro
White list Region: EUROPEAN_REGION
Black list Euro: LIST_140_150_amr
Black list AMR: NO_CARRIERS
L1 Power Result [Euro/ Amr]: RXLEV_IDX_1
Action_6: Send a MPH_POWER_REQ primitive to ALR with the search
mode, as
NORMAL_SEARH_MODE and white list carriers of one region shall
be same as blacklist car
rier of other region.

Ex: Same Data in European Region Blacklist and
American Region white list could be send in
MPH_POWER_REQ.
Result_6: MPH_POWER_CNF should have the white list carriers
provided by RR. (This test case is to
verify that the other region black list carriers
should not remove the white list carriers).
(ARFCN_14_STD_EGSM, ARFCN_1_STD_EGSM,
ARFCN_23_STD_EGSM,
ARFCN_150_STD_DUAL_US, ARFCN_140_STD_DUAL_US,
ARFCN_124_STD_EGSM,
ARFCN_250_STD_DUAL_US, ARFCN_130_STD_DUAL_US)

3.2.3 White List

Description

White list carriers reported by the RR will participate on top of
the MPH_POWER_CNF primitive in decreasing order of rxlevel. The
remaining carriers will follow the white list carriers in
decreasing order of the rxlevel. The following test cases are to
test the behavior of the ALR when the RR provides white list
carriers.

3.2.3.1.1 ALR9807 White list cases

Scenario 1 [with less than 32 carriers]

Precondition

White list: LIST_1_14_euro
White list Region: EUROPEAN_REGION
Black list Euro: NO_CARRIERS
Black list AMR: NO_CARRIERS
L1 Power Result [Euro/ Amr]: RXLEV_IDX_1
Action_1: Send a MPH_POWER_REQ primitive to ALR with the search
mode as FULL_SEARH_MODE and send some carriers as white list
carriers to the ALR.
Result_1: White list carriers provided by the RR needs to be
reported on top of the MPH_POWER_CNF in decreasing order of the
signal strength; other carriers will follow the white list
carriers in decreasing order of Rxlevel (ARFCN_14_STD_EGSM,
ARFCN_1_STD_EGSM, ARFCN_23_STD_EGSM, ARFCN_150_STD_DUAL_US,

ARFCN_140_STD_DUAL_US, ARFCN_124_STD_EGSM, ARFCN_250_STD_DUAL_US,
ARFCN_130_STD_DUAL_US).

3.2.3.1.2 Scenario 2 [with more than 32 carriers]

Precondition

White list: LIST_garbage_euro

White list Region: EUROPEAN_REGION

Black list Euro: NO_CARRIERS

Black list AMR: NO_CARRIERS

L1 Power Result [Euro/ Amr]: RXLEV_IDX_9

Action_2: Send a MPH_POWER_REQ primitive to ALR with the search mode as FULL_SEARH_MODE and send more than 32 carriers as white list to the ALR.

Result_2: Only 32 carriers provided by the RR needs to be reported on top of the MPH_POWER_CNF in decreasing order of the signal strength; other carriers will follow the white list carriers in decreasing order of Rxlevel. The remaining white list carriers have to be ignored by the ALR. (ARFCN_3_STD_EGSM, ARFCN_6_STD_EGSM, ARFCN_12_STD_EGSM, ARFCN_17_STD_EGSM, ARFCN_22_STD_EGSM, ARFCN_27_STD_EGSM, ARFCN_16_STD_EGSM, ARFCN_123_STD_EGSM, ARFCN_23_STD_EGSM, ARFCN_11_STD_EGSM ...)

3.2.3.1.3 Scenario 3 [without any carrier]

Precondition

White list: LIST_1_14_euro

White list Region: EUROPEAN_REGION

Black list Euro: NO_CARRIERS

Black list AMR: NO_CARRIERS

L1 Power Result [Euro/ Amr]: RXLEV_IDX_10

Action_1: Send a MPH_POWER_REQ primitive to ALR with the search mode as FULL_SEARH_MODE and send some carriers as white list to the ALR. L1 will report 0 carriers to ALR during measurement.

Result_1: MPH_POWER_CNF will have 0 carriers. (NO_CARRIERS)

3.2.4 Rxlevel

Description

ALR will have the accumulated power level during power measurement. When reports to RR it has to send an average of the total measurement. The number of attempts vary depend on the type of search mode. The following test cases are to test the behavior ALR for different search mode rxlevel.

3.2.4.1.1 ALR9809 Rxlevel cases

Scenario 1 - FULL SEARH MODE

Precondition

White list: LIST_1_14_euro

White list Region: EUROPEAN_REGION

Black list Euro: LIST_1_14_euro

Black list AMR: NO_CARRIERS

L1 Power Result [Euro/ Amr]: RXLEV_IDX_1

Action_1: RR provides MPH_POWER_REQ with FULL_SEARH_MODE and also no white list or black list carriers are present.

Result_1: RR should receive the MPH_POWER_CNF with rxlevel of each carrier = (accumulated power level reported by L1 / 5).

(Rxlevel = 44, 21, 56, 50, 44, 25, 25, 21)

Scenario 2 - NORMAL SEARH MODE

Precondition:

White list: LIST_1_14_euro
White list Region: EUROPEAN_REGION
Black list Euro: LIST_1_14_euro
Black list AMR: NO_CARRIERS
L1 Power Result [Euro/ Amr]: RXLEV_IDX_1
Action_2: RR provides MPH_POWER_REQ with NORMAL_SEARH_MODE and also no white list or black list carriers are present.
Result_2: RR should receive the MPH_POWER_CNF with rxlevel of each carrier = (accumulated power level reported by L1 / 5).
(Rxlevel = 56, 50, 44, 25, 25, 21)

Scenario 3 - FAST SEARH MODE

Precondition:

White list: LIST_1_14_euro
White list Region: EUROPEAN_REGION
Black list Euro: LIST_1_14_euro
Black list AMR: NO_CARRIERS
L1 Power Result [Euro/ Amr]: RXLEV_IDX_1
Action_3: RR provides MPH_POWER_REQ with FAST_SEARH_MODE and also no white list or black list carriers are present.
Result_3: RR should receive the MPH_POWER_CNF with rxlevel of each carrier = (accumulated power level reported by L1).
Rxlevel = (24, 250, 220, 125, 125, 105).

Scenario 4 - BLACK LIST SEARH MODE

In case of blacklist search the number of channels in MPH_POWER_CNF will be always 0. So testing rxlevel is not needed in case of BLACK_LIST_SEARCH.

3.2.5 American Band

Description

The following test cases are to test the American band, because the earlier test case where covered mostly the European region carriers.

3.2.5.1.1 ALR9810 American band cases

Scenario 1: ALR9810 US BIT

Precondition:

Frequency band: BAND_GSM_850
White list: LIST_130_amr
White list Region: EUROPEAN_REGION
Black list Euro: LIST_1_14_euro
Black list AMR: NO_CARRIERS
L1 Power Result [Euro/ Amr]: RXLEV_IDX_1
Action_1: Set the band to American and send the American frequencies with higher signal strength.
Result_1: In MPH_POWER_CNF primitive the US Bit for the American arfcn should be set ARFCN_150_STD_850, ARFCN_140_STD_850, ARFCN_250_STD_850, ARFCN_130_STD_850).

Scenario 2: ALR9810 Blacklisted carrier

Precondition:

White list: LIST_130_amr
White list Region: AMERICAN_REGION
Black list Euro: NO_CARRIERS
Black list AMR: LIST_140_150_amr

L1 Power Result [Euro/ Amr]: RXLEV_IDX_1
Action_1: Set the band to American and send some American region frequencies as blacklisted carriers. L1 should send rxlevel of these carriers with more than LOWER_RXLEV_THRESHOLD.
Result_1: In MPH_POWER_CNF primitive should not have these arfcns, since its blacklisted. The Power Cnf will have the following arfcns (ARFCN_130_STD_850, ARFCN_250_STD_850).

3.2.6 Parallel TYPE

Description

The following test cases are to cover the parallel search type, because the earlier test cases use only the non-parallel type. The parallel type will be used only in case of the MS is in idle mode, and the other task would not get disturbed while doing the power measurement.

3.2.6.1.1 ALR9811 FULL SEARH MODE

Precondition:

White list: LIST_1_14_euro
White list Region: EUROPEAN_REGION
Black list Euro: LIST_1_14_euro
Black list AMR: NO_CARRIERS
L1 Power Result [Euro/ Amr]: RXLEV_IDX_1

Action_1: Set the MS in IDLE mode

Result_1: MS will enter in to IDLE mode

Action_2: Send a MPH_POWER_REQ with FULL SEARCH mode and search type as parallel.

Result_2: MPH_POWER_CNF will be sent to RR.

Action_3: Send a Random Access Request to ALR to ensure that still the MS in IDLE state after the Parallel type search.

Result_3: ALR should accept the Random Access Request and should forward that to L1.

3.2.6.1.2 ALR9812 NORMAL SEARH MODE

Precondition:

White list: LIST_1_14_euro
White list Region: EUROPEAN_REGION
Black list Euro: LIST_1_14_euro
Black list AMR: NO_CARRIERS
L1 Power Result [Euro/ Amr]: RXLEV_IDX_1

Action_1: Set the MS in IDLE mode

Result_1: MS will enter in to IDLE mode

Action_2: Send a MPH_POWER_REQ with NORMAL SEARCH mode and search type as parallel.

Result_2: MPH_POWER_CNF will be sent to RR.

Action_3: Send a Random Access Request to ALR to ensure that still the MS in IDLE state after the Parallel type search.

Result_3: ALR should accept the Random Access Request and should forward that to L1.

3.2.6.1.3 ALR9813 FAST SEARH MODE

Precondition:

White list: LIST_1_14_euro
White list Region: EUROPEAN_REGION
Black list Euro: LIST_1_14_euro
Black list AMR: NO_CARRIERS
L1 Power Result [Euro/ Amr]: RXLEV_IDX_1

Action_1: Set the MS in IDLE mode

Result_1: MS will enter in to IDLE mode
Action_2: Send a MPH_POWER_REQ with FAST SEARCH mode and search type as parallel.
Result_2: MPH_POWER_CNF will be sent to RR.
Action_3: Send a Random Access Request to ALR to ensure that still the MS in IDLE state after the Parallel type search.
Result_3: ALR should accept the Random Access Request and should forward that to L1.

3.2.6.1.4 ALR9814 BLACK LIST SEARCH MODE

Precondition:

White list: LIST_1_14_euro
White list Region: EUROPEAN_REGION
Black list Euro: LIST_1_14_euro
Black list AMR: NO_CARRIERS
L1 Power Result [Euro/ Amr]: RXLEV_IDX_1

Action_1: Set the MS in IDLE mode
Result_1: MS will enter in to IDLE mode
Action_2: Send a MPH_POWER_REQ with BLACK LIST SEARCH mode and search type as parallel.
Result_2: MPH_POWER_CNF will be sent to RR.
Action_3: Send a Random Access Request to ALR to ensure that still the MS in IDLE state after the Parallel type search.
Result_3: ALR should accept the Random Access Request and should forward that to L1.

3.2.7 General

Description

The following test cases are to test the general behavior of cell selection improvement implementation in ALR.

3.2.7.1.1 ALR9815 General Cell Selection Improvement cases

3.2.7.1.1.1 Scenario 1 - All carriers are lower than min rxlevel

Precondition:

White list: FALSE
White list Region: NO_CARRIERS
Black list Euro: NO_CARRIERS
Black list AMR: NO_CARRIERS
L1 Power Result [Euro/ Amr]: RXLEV_IDX_12

Action_1: L1 is reporting all carriers rxlevel are less than the LOWER_THRESHOLD.

Result_1: All the Carriers should be added to the MPH_POWER_CNF as inactive carriers (LIST_1_14_23_124_euro, LIST_130_140_150_250_155_amr).

3.2.7.1.1.2 Scenario 2 - No white list carriers reported by L1

Precondition:

White list: LIST_131_143_152_251_156_amr
White list Region: AMERICAN_REGION
Black list Euro: NO_CARRIERS
Black list AMR: NO_CARRIERS
L1 Power Result [Euro/Amr]: RXLEV_IDX_1

Action_2: L1 is reporting all carriers with rxlevel more than LOWER_THRESHOLD, and RR has not reported any white list, black list carriers.

Result_2: All the Carriers should be added to the MPH_POWER_CNF in decreasing order of the rxlevel (ARFCN_23_STD_EGSM, ARFCN_150_STD_DUAL_US, ARFCN_14_STD_EGSM, ARFCN_140_STD_DUAL_US,

ARFCN_124_STD_EGSM, ARFCN_250_STD_DUAL_US, ARFCN_1_STD_EGSM,
ARFCN_130_STD_DUAL_US).

3.2.7.1.1.3 Scenario 3 - White list invalid

Precondition:

White list: FALSE

White list Region: EUROPEAN_REGION

Black list Euro: NO_CARRIERS

Black list AMR: NO_CARRIERS

L1 Power Result [Euro/Amr]: RXLEV_IDX_1

Action_3: RR provides MPH_POWER_REQ with FULL_SEARCH_MODE and also the white_list_valid as FALSE.

Result_3: All the Carriers should be added to the MPH_POWER_CNF in decreasing order of the rxlevel and the number of white list carrier should be equal to 0 (ARFCN_23_STD_EGSM, ARFCN_150_STD_DUAL_US, ARFCN_14_STD_EGSM, ARFCN_140_STD_DUAL_US, ARFCN_124_STD_EGSM, ARFCN_250_STD_DUAL_US, ARFCN_1_STD_EGSM, ARFCN_130_STD_DUAL_US).

3.2.7.1.1.4 Scenario 4 - White list valid and NO white list carriers

Precondition:

White list: NO_CARRIERS

White list Region: EUROPEAN_REGION

Black list Euro: NO_CARRIERS

Black list AMR: NO_CARRIERS

L1 Power Result [Euro/Amr]: RXLEV_IDX_1

Action_4: RR provides MPH_POWER_REQ with FULL_SEARCH_MODE and also the white_list_valid as TRUE and there is no white list carrier sent to ALR.

Result_4: All the Carriers should be added to the MPH_POWER_CNF in decreasing order of the rxlevel and the number of white list carrier should be equal to 0 (ARFCN_23_STD_EGSM, ARFCN_150_STD_DUAL_US, ARFCN_14_STD_EGSM, ARFCN_140_STD_DUAL_US, ARFCN_124_STD_EGSM, ARFCN_250_STD_DUAL_US, ARFCN_1_STD_EGSM, ARFCN_130_STD_DUAL_US).

3.2.7.1.2 ALR9817 Max ARFCN Boundary for MPH_POWER_CNF

Precondition:

White list: LIST_130_amr

White list Region: AMERICAN_REGION

Black list Euro: NO_CARRIERS

Black list AMR: NO_CARRIERS

L1 Power Result [Euro/Amr]: RXLEV_IDX_11

Action_1: RR provides MPH_POWER_REQ with FULL_SEARCH_MODE without any black list and send some white list carriers. L1 should report more than 80 carriers including the white list carriers with more than LOWER_THRESHOLD.

Result_1: All the Carriers should be added to the MPH_POWER_CNF in decreasing order of the rxlevel and white list (130) carrier should be reported on top. The maximum carriers in the MPH_POWER_CNF should not be more than 80.

3.2.8 Measurement Report after Black list Search

Description

ALR will forward the measurement report to RR only the Neighbor Cell state is in "NC_IDLE". The following test case is to test the

ALR, whether it's forwarding the Measurement report to RR after the parallel search is over.

As per the existing code after the parallel search the MPH_BSIC_REQ has to be sent to ALR, to enable the ALR to forward the MEASUREMENT_IND to RR. But in case of Blacklist search the number of carriers will be always 0 and there will not be any MPH_BSIC_REQ sent to ALR. In ALR if the search type is Blacklist search the NC state will be changed to NC_IDLE, before sending the MPH_POWER_CNF to RR.

3.2.8.1.1 ALR9816 Measurement Report after Black list Search

Action_1: ALR will forward the measurement report to RR only the Neighbor Cell state is in "NC_IDLE". Start a Blacklist search from RR.

Result_1: After the MPH_POWER_CNF wait for the measurement report from ALR.

3.2.9 Cell Selection Improvement Phase II Test cases

Description:

As part of this phase II of cell selection improvement the region selection problem is implemented in ALR module.

3.2.9.1.1 ALR9817

Description: Test case to test the carrier's priority, whether alr is giving priority to first 40 carriers of all band or not.

Action_1: L1 will report carriers from all bands.

Result_1: ALR should give priority to first 40 carriers of all bands. The carriers that fall after the 40 carriers will have less priority than the first 40 carriers of other band though it may have more power (rxlevel).

3.2.9.1.2 ALR9818

Description: Test case to test the alr whether it's removing the unknown carriers during the power measurement.

Action_1: L1 will report some wrong arfcn to alr, to test that whether alr is taking care of wrong arfcn or not.

Result_1: ALR has to avoid the wrong carriers during the carrier count as well as reporting to RR. Only the carriers that have correct arfcn will be forwarded to RR in primitive MPH_POWER_CNF.

3.2.9.1.3 ALR9819

Description: Test case to test whether alr is removing all carriers after adding 60 carriers for a particular band.

Action_1: L1 will report more than 60 carriers for a band.

Result_1: ALR will report maximum 60 carriers per band to RR in MPH_POWER_CNF. During the sorting ALR will remove all the carriers to a particular band.

3.2.9.1.4 ALR9820

Description: Number of carriers per band count includes the white list carriers also. This test case is to test whether alr is including the white list carrier also in the count or not.

Action_1: L1 will report more than 60 carriers for a band including white list carriers.

Result_1: ALR should count the white list as part of the normal 40 carriers and other band carriers should get priority if 40 carriers are filled for a band.

3.2.9.1.5 ALR9821

Description: Test case to test whether alr is removing all the inactive carriers before doing sorting or not. This can be verified by the traces printed in the PCO Tool.

Action_1: L1 will report more inactive carriers to ALR.

Result_1: Inactive carriers should get removed before the sorting to save the runtime. The PCO log will show the traces how many inactive carrier has been removed.

4 Target Tests

Some basic sanity tests are identified and performed with Leonardo+ boards at Sasken premises. The tests are described below.

4.1 Full service after power on

Description: MS enters Full Service after power on

Precondition: Black List is empty

White List is empty

Normal Network SIM

Action1: Switch on the MS

Result1: MS enters Full Service

Action2: Originate MO call

Results2: MO call is established

Action3: Disconnect MO call

Result3: MO call is disconnected and MS enters IDLE mode

Action4: Make an MT call

Result4: MT call is established

Action5: Release the MT call

Result5: MT call is released and MS enters IDLE mode

Action6: Send an SMS

Result6: SMS is sent and mobile comes back to IDLE mode

Action7: Perform GPRS attach

Result8: GPRS attach is performed successfully

Action9: Perform Actions (2 to 6) when MS is GPRS attached

Result9: Outcome must match with the corresponding results

4.2 No service after power on

Description: MS enters No Service after power on

Precondition: Black List is empty

White List is empty

Normal Network SIM

Antenna is removed

Action1: Switch on the MS

Result1: MS enters No Service.

TREG timer is started in RR

Action2: TREG timer expires

Results2: Normal search is started.

T_NORMAL_CS timer is started

Action3: T_REG expires again

Result3: Normal search is started again. Normal search is used till T_NORMAL_CS timer is active

Action4: T_NOTMAL_CS timer expires. TREG timer expires.

Result4: Full search is started

Action5: TREG timer expires again

Result5: Normal search is started. T_NORMAL_CS timer is started.

Action6: Attach the Antenna to MS. Wait for TREG expiry. TREG expires
Result6: Normal search is started. MS enters Full service.
TREG and T_NORMAL_CS timers are stopped
Action7: Repeat Actions (2 to 9) from 4.1
Result8: MS responds correctly

4.3 White List storage on FFS

Description: White List is stored on FFS during switch off in Full Service

Precondition: Black List is empty
White List is empty
Normal Network SIM

Action1: Switch on the MS
Result1: MS enters Full Service
Action2: Switch off the MS
Results2: White is stored on FFS
Action3: Switch on the MS
Result3: Check that White List is read from FFS and sent in the MPH_POWER_REQ primitive to ALR
ALR places all the White List carriers at the top in MPH_POWER_CNF primitive
RR camps on the White List carrier
MS enters Full Service
Action9: Perform Actions (2 to 9) as described in 4.1
Result9: MS responds correctly

4.4 Black List storage on FFS

Description: Black List is stored on FFS during switch off

Precondition: Black List is empty
White List is empty
Normal Network SIM

Action1: Switch on the MS
Result1: MS enters Full Service
Action2: Add some carriers to Black List through "SET_BL" configuration command to both regions
Switch off the MS.
Results2: Black List and White List are stored on FFS
Action3: Switch on the MS
Result3: Check that Black List and White List is read from FFS and sent in the MPH_POWER_REQ primitive to ALR
ALR places all the White List carriers at the top in MPH_POWER_CNF primitive
RR camps on the White List carrier
MS enters Full Service
Action9: Perform Actions (2 to 9) as described in 4.1
Result9: MS responds correctly

4.5 Black List storage on FFS

Description: MS enters Full Service after power on

Precondition: Black List is available on FFS
White List is available on FFS
Normal Network SIM

Action1: Switch on the MS

Result1: MS enters Full Service
Action2: Add some carriers to Black List through "SET_BL"
configuration command to both regions
Switch off the MS.
Results2: Black List and White List are stored on FFS
Action3: Switch on the MS
Result3: Check that Black List and White List is read from FFS
and sent in the MPH_POWER_REQ primitive to ALR
ALR places all the White List carriers at the top in
MPH_POWER_CNF primitive
RR camps on the White List carrier
MS enters Full Service
Action4: Perform Actions (2 to 9) as described in 4.1
Result4: MS responds correctly

4.6 Downlink error in Full service

Description: Trigger Downlink error when the MS is in IDLE
state providing Full Service. Observe that the Fast search is
used, followed by Normal and Full search modes.

Precondition: Black List is available on FFS
White List is available on FFS
Normal Network SIM

Action1: Switch on the MS
Result1: MS enters Full Service

Action2: Remove the Antenna
Results2: Downlink error is triggered in RR
RR starts Fast Search. T_FAST_CS timer is started
Black List and White List are used in MPH_POWER_REQ
primitive sent to ALR
ALR places White List carriers at the top of
MPH_POWER_CNF array
ALR doesn't include Black List carriers in the
MPH_POWER_CNF array
MS enters No Service state. TREG timer is started.

Action3: TREG expires
Result3: Fast search is started again. Fast search is used till
T_FAST_CS timer is active.
Black List and White List are used in MPH_POWER_REQ primitive sent
to ALR
ALR places White List carriers at the top of
MPH_POWER_CNF array
ALR doesn't include Black List carriers in the
MPH_POWER_CNF array
MS enters No Service state. TREG timer is started.

Action4: T_FAST_CS timer expires. TREG timer expires
Result4: Normal search is started. T_NORMAL_CS timer is started
Black List and White List are used in MPH_POWER_REQ primitive sent
to ALR
ALR places White List carriers at the top of
MPH_POWER_CNF array

ALR doesn't include Black List carriers in the MPH_POWER_CNF array
 MS enters No Service state. TREG timer is started.

Action5: TREG timer expires. TREG timer expires
 Result5: Normal search is started. Normal search is used till T_NORMAL_CS timer is active
 Black List and White List are used in MPH_POWER_REQ primitive sent to ALR

ALR places White List carriers at the top of MPH_POWER_CNF array
 ALR doesn't include Black List carriers in the MPH_POWER_CNF array
 MS enters No Service state. TREG timer is started.

Action6: T_NORMAL_CS timer expires. TREG timer expires
 Result6: Full search is started
 Black List and White List are used in MPH_POWER_REQ primitive sent to ALR

ALR places White List carriers at the top of MPH_POWER_CNF array
 ALR includes Black List carriers in the MPH_POWER_CNF array
 MS enters No Service state. TREG timer is started.

Action7: Attach the antenna. To MS. T_NORMAL_CS timer expires. TREG timer expires
 Result7: Full search is started
 Black List and White List are used in MPH_POWER_REQ primitive sent to ALR

ALR places White List carriers at the top of MPH_POWER_CNF array
 ALR includes Black List carriers in the MPH_POWER_CNF array
 MS enters Full service.

Action8: T_NORMAL_CS timer expires. TREG timer expires
 Result8: Full search is started
 Black List and White List are used in MPH_POWER_REQ primitive sent to ALR

ALR places White List carriers at the top of MPH_POWER_CNF array
 ALR includes Black List carriers in the MPH_POWER_CNF array
 MS enters No Service state. TREG timer is started.

Action9: Perform Actions (2 to 9) as described in 4.1
 Result9: MS responds correctly

4.7 Voice call for less than 30 seconds

Description: Make a voice call for less than 30 seconds. MS starts Normal search while going back to IDLE state from dedicated state.

Precondition: Black List is available on FFS
 White List is available on FFS
 Normal Network SIM

Action1: Switch on the MS
Result1: MS enters Full Service

Action2: Establish a voice call and release the call before 30 seconds

Result2: RR starts Normal search and enters IDLE mode.

4.8 Voice call for more than 30 seconds

Description: Make a voice call for more than 30 seconds. MS starts Normal search while going back to IDLE state from dedicated state.

Precondition: Black List is available on FFS
 White List is available on FFS
 Normal Network SIM

Action1: Switch on the MS
Result1: MS enters Full Service

Action2: Establish a voice call and release the call after 30 seconds

Result2: RR starts Normal search and enters IDLE mode.

4.9 Downlink error in dedicated state

Description: Trigger downlink error when MS is in dedicated state. MS starts Fast search, followed by Normal and Full search.

Precondition: Black List is available on FFS
 White List is available on FFS
 Normal Network SIM

Action1: Switch on the MS
Result1: MS enters Full Service

Action2: Establish a voice call. Remove the Antenna when the voice call is active.

Results2: Downlink error is triggered in RR

 RR starts Fast Search. T_FAST_CS timer is started

 Black List and White List are used in MPH_POWER_REQ primitive sent to ALR

 ALR places White List carriers at the top of MPH_POWER_CNF array

 ALR doesn't include Black List carriers in the MPH_POWER_CNF array

 MS enters No Service state. TREG timer is started.

Action3: TREG expires

Result3: Fast search is started again. Fast search is used till T_FAST_CS timer is active.

Black List and White List are used in MPH_POWER_REQ primitive sent to ALR

 ALR places White List carriers at the top of MPH_POWER_CNF array

ALR doesn't include Black List carriers in the MPH_POWER_CNF array
 MS enters No Service state. TREG timer is started.

Action4: T_FAST_CS timer expires. TREG timer expires
 Result4: Normal search is started. T_NORMAL_CS timer is started
 Black List and White List are used in MPH_POWER_REQ primitive sent to ALR
 ALR places White List carriers at the top of MPH_POWER_CNF array
 ALR doesn't include Black List carriers in the MPH_POWER_CNF array
 MS enters No Service state. TREG timer is started.

Action5: TREG timer expires. TREG timer expires
 Result5: Normal search is started. Normal search is used till T_NORMAL_CS timer is active
 Black List and White List are used in MPH_POWER_REQ primitive sent to ALR
 ALR places White List carriers at the top of MPH_POWER_CNF array
 ALR doesn't include Black List carriers in the MPH_POWER_CNF array
 MS enters No Service state. TREG timer is started.

Action6: T_NORMAL_CS timer expires. TREG timer expires
 Result6: Full search is started
 Black List and White List are used in MPH_POWER_REQ primitive sent to ALR
 ALR places White List carriers at the top of MPH_POWER_CNF array
 ALR includes Black List carriers in the MPH_POWER_CNF array
 MS enters No Service state. TREG timer is started.

Action7: Attach the antenna. To MS. T_NORMAL_CS timer expires. TREG timer expires
 Result7: Full search is started
 Black List and White List are used in MPH_POWER_REQ primitive sent to ALR
 ALR places White List carriers at the top of MPH_POWER_CNF array
 ALR includes Black List carriers in the MPH_POWER_CNF array
 MS enters Full service.

Action8: T_NORMAL_CS timer expires. TREG timer expires
 Result8: Full search is started
 Black List and White List are used in MPH_POWER_REQ primitive sent to ALR
 ALR places White List carriers at the top of MPH_POWER_CNF array
 ALR includes Black List carriers in the MPH_POWER_CNF array

MS enters No Service state. TREG timer is started.

Action9: Perform Actions (2 to 9) as described in 4.1

Result9: MS responds correctly

4.10 Black List search after Location update following cell reselection

Description: MS reselects a cell belonging to another location area. Black List search is started after the completion of LAU. MS enters IDLE state after Black List search.

Precondition: Black List is available on FFS
White List is available on FFS
Normal Network SIM

Action1: Switch on the MS

Result1: MS enters Full Service

Action2: Force cell reselection to a cell belonging to another Location area.

Result2: LAU is performed. Black List search is started after completion of LAU procedure.

All Black List carriers are included in the MPH_POWER_REQ primitive sent to ALR during Black List search.

ALR responds with MPH_POWER_CNF primitive.

MS enters IDLE state after this.

ALR continues posting MPH_MEASUREMENT_IND to RR

Action3: Perform Actions (2 to 9) as described in 4.1

Result3: MS responds correctly

5 Conformance Tests

The new implementation of Cell Selection algorithm will affect GCF tests. Test Cases from 20.x and 26.x series should be retested and validated.

We could test only 20.x series GCF test cases at Sasken. 26.x series could not be tested at Sasken due to unavailability of Anite slots at TI-INDIA.

6 Alcatel Tests

The new implementation of Cell Selection algorithm will affect several Alcatel Test Cases.

All Test Cases from the following packages should be retested: SOS, MML, NAC, and PLM & SEL.

Selected Test Cases from the following packages should be retested: FRE, LOW & CCH.

7 Field Tests

It is very important that the new implementations be tested in problematic areas. Such areas are regions with more than two frequency bands (Thailand) and places with influence of CDMA carriers (USA, Southern California, and Chicago). The results should be studied to adapt parameters listed in [2], Section 6 Configurable Parameters.

Purpose