Admission Control Feature Guide

WCDMA RAN

Admission Control Feature Guide

Version	Date	Author	Reviewer	Notes
V6.0	2011-6-2	Sha Xiubin	Zheng Dan	1. Delete "MBMS Admission Control" from "Function Introduction" for it's MBMS FG Feature 2. Delete "Operator Specific CE Resource" from "Function Introduction" for it's RAN Sharing FG Feature 3. Ptotal Updated to effective power load 4. Add F-DPCH admission control 5. Add strategy for PLMN changed in CE admission control for PLMN Sharing 6. CE for Common Channel(except for MBMS) is reserved by Node B, CE of MBMS for PLMN Sharing is used by Common PLMN 7. Add UPLINK ENHANCED CELL_FACH admission control 8. Add DOWNLINK ENHANCED CELL_FACH admission control 9. Update admission control based on signaling user number from DCH signaling to signaling carried on CELL_DCH state 10. E-DCH CE Consistency assuring between RNC and Node B 11. Add "1/2 max reference rate attempt" when Total RLC AM and MAC-hs buffer size limited 12. OMC Path of the following parameters changed: UlCacSwitch, DlCacSwitch, RefSFLayer, BckNoiseAdjSwh, OriBckNoise, CpichEcN0, PathLoss, RrcSigUsrNumThr, AmrRncAdjust, AmrDnRateAcSwch 13. Delete the following parameters: UlInterFactor/ EcNoValidTimeWin/

				EcN0RptInd(Inra)/ RscpRptInd(Intra)/PathlossRptInd(Intra)/ EcN0RptInd(Inter)/ RscpRptInd(Inter)/ PathlossRptInd(Inter)/ UnldThresh/ DeltaThr/ DRtlightldThr/ LdFactCalSrvNum/ BgNoiUptSrvNum/ StaWinNum/ EffUnldCntThr/ NoiOffsetThr/ BckNoiThr/ BckNoiMaxStep/ BckNoiMaxAdjAst/ BckNoiUpFactor/ BckNoiDnFactor/ MinOrthogFactor/ MaxOrthogFactor/UnldThresh/ StaWinNum/FachCacToMinRate, IntraRachRptQPre, RachMaxRptCell, RachMaxRptCelPre, RptQuan, EstMinHsdpaPwr 14. The Parameter name /OMC Path of the following parameters changed: HsdschTrafLimit/ EdchTrafLimit 15. Add Parameter:LoadScene 16. “less than” changed to “less than or equal to” in “Cell zero-load decision” of “Automatic measurement of uplink noise floor” 17. BgNoiUptSrvNum should be LdFactCalSrvNum in in “Cell zero-load decision” of “Automatic measurement of uplink noise floor” 18. Update code default value of BGNOIUPTSRVNUM,LdFactCalSrvNum ,DeltaThr, EffUnldCntThr, StaWinNum, BckNoiMaxAdjAst in “Automatic measurement of uplink noise floor”
V6.1	2012-2-27	Sha Xiubin	Sun Lin	1. Update “UE RLC Capability-based Admission Control” 2. Update CE Share Mode Switch judgment in “Admission Control when the Cells in Different PLMNs Share the CE resources” 3. HSPA User Number and Downlink

				Channel Capacity-based Admission Control updated, concurrence service is considered 4. RNC Response for CE admission rejection in NodeB is Added 5. Formula for Effective load updated

TABLE OF CONTENTS

FIGURES

TABLES

1 Functional Attribute

System version: [RNC V3.11.10/RNC V4.11.10, OMMR V3.11.10/V4.11.10, Node B V4.11.10, OMMB V4.11.10]

Attribute: [Optional function]

Involved NEs:

UE	Node B	RNC	MSCS	MGW	SGSN	GGSN	HLR
√	√	√	-	-	-	-	-
Note: *-: Not involved. *√: Involved.							

Dependent function: [None].

Mutually exclusive function: [None].

Remarks: [None]

2 Overview

2.1 Function Introduction

The admission control algorithm implements the following major functions:

- Deciding whether to access new service according to the requirement of the requested service and current cell resource utilization when a service requests new cell resources (for example, access of new service to a cell, rate increase of PS services carried on DCH, and status switching between CELL_FACH and CELL_DCH, and between DCH and HSPA channel), so as to avoid system overload after admission of new service and ensure system stability.

- Enabling access as many services as possible if resources permit, so as to make full use of system resources and ensure QoS for UEs.

The scenarios that a service requests new cell resources include:

- Radio Resource Control (RRC) connection setup.
- Radio Access Bearer (RAB) setup.
- RAB modification.
- Serving Radio Network Controller (SRNC) relocation.
- Handover over Iur interface.
- Intra-RNC handover.
- Dynamic channel allocation.

Upon receiving any of the above requests, RNC will:

1. Select transport channel type according to service attributes (Traffic Class, maximum bit rate and so on) and equipment capability (UE and cell capabilities) (For details, see *ZTE UMTS DRBC Algorithm Feature Guide*).

2. Implement admission decision procedure according to the resource utilization of target channel in current cell and amount of resources required.

When a service requests new cell resources, RNC needs to take into full consideration of the utilization of the following cell resources: uplink interference, downlink power, channelization code resources, CE resources and number of UEs carried in a cell, and make an overall planning of system resources beforehand to avoid either resource insufficiency during service access or cell overload after accessing services.

When service will be setup in CELL_DCH, uplink admission control function is controlled by switch of *UlCacSwitch* and downlink admission control function is controlled by switch of *DlCacSwitch* separately. When service will be setup in CELL_FACH, no admission control switch controlled. i.e. for DCH/DCH admission control: whether uplink interference based admission control is used is controlled by switch of Cell Uplink Admission Control Switch *(UlCacSwitch);* whether downlink power based admission control is used, whether downlink code resource based admission control is used and whether Data Throughput-based Admission Control is used are controlled by switch of Cell Downlink Admission Control Switch *(DlCacSwitch).*

Furthermore, MBMS Admission Control is also controlled by Cell Downlink Admission Control Switch *(DlCacSwitch).* If the switch is set to “1:on”, MBMS Admission Control function should be used; else, MBMS Admission Control function is not used.

It is not allowed to access any new service in Cell_DCH state for overload cell, and this is not controlled by *UlCacSwitch* or *DlCacSwitch* (For the decision of the overload state, please see < ZTE UMTS Overload Control Feature Guide >).

Note: For admission control of transmission resources, see *ZTE UMTS RAN Transmission Overview Feature Guide*.

2.1.1 Admission Control for R99 Service

This feature implements radio access control for incoming R99 service request. Admission control avoids overload of the air interface and prevents the radio resources from depletion. Admission control allocates system resources respectively to users and services without degrading the system stability.

1. When the service requires new system resources, the RNC needs to consider the resources utilized as follows:

- Uplink interference
- Downlink power
- Downlink channelization code resource
- CE resource in base band board
- Number of subscribers

The RNC also needs to evaluate the system resources in advance. This can avoid the occurrence of insufficient resources when the service is connected to the system or the occurrence of the system overload after the service is connected to the system.

During the judgment of uplink interference and downlink power, admission control measures uplink capacity and downlink capacity respectively by RTWP and TCP. The RNC requests the Node B to report real-time RTWP and TCP periodically.

ZTE RAN system differentiates users and services of different priorities, enabling high-priority users and services to occupy more system resources and access services of higher QoS level.

2.1.2 Admission Control for HSDPA Service

This feature implements radio access control for incoming HSDPA service request. Admission control avoids overload of the air interface and prevents the radio resources from depletion. Admission control allocates system resources respectively to users and services without degrading the system stability.

When Node B and UE support HSDPA, it is possible to allocate HSDPA wireless resources. The scenarios where the service requires new system resources including RRC connection setup, RAB setup, RAB modification, SRNC relocation, Iur relocation, handover over Iur, intra-RNC handover, and dynamic channel allocation, etc. ZTE RAN equipments will fully consider the existing resource status in advance to prevent the lack of resources when the HSDPA services access or the system overload after the services have accessed.

- Number of HSDPA Users

  Excessive users sharing the HS-DSCH channel will reduce the average user services QOS. According to the requirements of services, the maximum number of services can be limited by Number of HSDPA Users per cell.

- HSDPA Data Throughput

  The HSDPA data throughput is performed for the GBR service, like streaming and conversation service. It will set an HSDPA cell throughput threshold for the new HSDPA service.

- Downlink Power

  The HS-DSCH admission control based on downlink power is performed for the GBR service only. RNC will forecast based on the changes of download power after the new HSDPA services have accessed. It will set a total HSDPA downlink power threshold after the new services have accessed.

- Power and Codes Allocation for Associated DPCH/F-DPCH

  HSDPA users need to use associated DPCH (or associated F-DPCH). It is considered about the occupation of cell download channel code and base station CE resource based on associated DPCH (or associated F-DPCH).

ZTE RAN equipments will consider basic priority when using admission control. It is possible to make the high priority user and service to get more system resources to improve the QoS.

2.1.3 Admission Control for HSUPA Service

This feature implements radio access control for incoming HSUPA service request. Admission control differentiates service priority and allocates system resources to users and services according to service priority respectively without decreasing system stability.

If both Node B and UE are HSUPA capable, HSUPA radio resources can be allocated during service request process. The scenarios in which the service requires new system resources include RRC connection, RAB setup, RAB modification, SRNC relocation, handover over Iur, intra-RNC handover, and dynamic channel allocation, etc. In order to avoid resource exhaustion or overload when accepting new HSUPA service requests, ZTE RAN evaluates the system resources for HSUPA according to the following factors:

- Number of HSUPA users
- CE resource of Node B
- Uplink interference
- Capacity of downlink channel

The capacity of downlink channel is restricted by the number of E-HICH/E-RGCH. Each E-HICH/E-RGCH can be multiplexed for up to 20 HSUPA users.

When performing admission control, ZTE RAN system will consider basic strategy to enable users and services with higher priority to get more system resources and higher QoS level.

2.1.4 RSEPS based HSUPA RRM

This feature provides measurement on Received Scheduled E-DCH Power Share (RSEPS), which is used for admission control, load balance with certain accuracy so that effective RRM is achieved.

2.1.5 Noise Automatic Measurement

This feature measures background noise used in uplink load evaluation for RRM features including Admission Control, Overload Control, etc. Compared with static configuration of background noise, the dynamic measurement method tracks the change of background noise and evaluates uplink load more accurately.

3 Technical Description

3.1 R99 Admission Control

3.1.1 Related Measurement

3.1.1.1 Node B common measurement

1 Measurement of uplink interference

Uplink interference is a major factor affecting the uplink capacity (DCH) of WCDMA and is obtained through RTWP common measurement on Iub interface. Node B periodically sends measurement report to RNC. CRNC saves the RTWP measurement result received last time as the decision criterion for uplink load to judge whether to admit the new service. The common measurement report period of RTWP is controlled by parameters of *RptPrdUnit*(NbCom) and *RptPrd*(NbCom)

2 Downlink power measurement

Downlink power is a major factor affecting the downlink capacity (DCH) of WCDMA and is obtained through TCP common measurement on Iub interface. Node B periodically sends measurement report to RNC. CRNC saves the TCP common measurement result received last time as the decision criterion for downlink load to judge whether to admit the new service. The common measurement report period of TCP is controlled by parameters of *RptPrdUnit*(NbCom) and *RptPrd*(NbCom).

3.1.1.2 UE Channel Quality Acquisition Modes

RNC needs to acquire the P-CPICH RSCP/P-CPICH Ec/N0 in the place where UE is located when predicting downlink power. The P-CPICH RSCP/ P-CPICH Ec/N0 value reported from UE, stored in RNC and valid within *65535s;* if valid value is unavailable during admission decision, the default value of *CpichEcN0* is used as P-CPICH Ec/N0 .and the default value of *PathLoss* is used as path loss in the place where UE is located.

UE can report P-CPICH RSCP/P-CPICH Ec/N0/PATHLOSS value in the following message:

RRC CONNECTION REQUEST -->Measured results on RACH

CELL UPDATE--> Measured results on RACH

INITIAL DIRECT TRANSFER--> Measured results on RACH

UPLINK DIRECT TRANSFER--> Measured results on RACH

MEASUREMENT REPORT--> Measured results on RACH

MEASUREMENT REPORT--> Intra/Inter--> Cell measured results

Notes: for load balance or forced handover based on “Overlap” or “Covers” (*ShareCover, refer to < ZTE UMTS Load Balance Feature Guide.doc >*), the P-CPICH RSCP/ P-CPICH Ec/N0/PATHLOSS of target cell gets the P-CPICH RSCP/ P-CPICH Ec/N0/PATHLOSS value of the source cell.

Whether UE report P-CPICH RSCP/ P-CPICH Ec/N0/PATHLOSS value is based on the following condition:

- The P-CPICH Ec/No of current cell can be reported in IE “Measured results on RACH”

- The P-CPICH Ec/No, RSCP or Pathloss reported in measurement report for handover:

  whether UE reports P-CPICH Ec/No, RSCP or Pathloss in intra-frequency measurement report is based on the following strategy:

  CPICH Ec/No report indication: report.

  CPICH RSCP report indication: report

  Path loss report indication: not report (*PathlossRptInd* (Intra)) of cell intra-frequency measurement.

  whether UE reports P-CPICH Ec/No, RSCP or Pathloss in inter-frequency measurement results is based on the following strategy:

  CPICH Ec/No report indication: report.

  CPICH RSCP report indication: report.

  Path loss report indication: not report

3.1.1.3 Automatic measurement of uplink noise floor

WCDMA's uplink capacity is limited by the radio interference from neighbor cells and UEs. Prior knowledge of uplink noise floor is required for uplink interference admission decision. The uplink noise floor is related to radio environment and noise floor values may be different for different cells. The noise floor in the same cell may also change over time. ZTE UMTS supports automatic measurement of noise floor: If the automatic noise floor adjustment algorithm switch (*BckNoiseAdjSwh*) is set to "ON", the network side adopts automatic measurement result as the value of current noise floor in the cell; otherwise, the network side adopts initial noise floor (*OriBckNoise*) as the value of current noise floor.

3.1.1.3.1 Acquisition of the original noise floor

If a cell is set up or BckNoiseAdjSwh value changes from "OFF" to "ON", the original noise floor (*OriBckNoise*) is taken as current noise floor.

3.1.1.3.2 Up-adjustment of noise floor

If the automatic noise floor adjustment algorithm switch (*BckNoiseAdjSwh*) is set to "ON", the basic principle for network side to perform automatic noise floor measurement is as follows: Detecting load of current cell and neighbor cells and takes the RTWP of current cell as the value of cell noise floor when the load of current cell and neighbor cells borders on zero. The specific strategy is as follows:

1 Cell zero-load decision

When the number of services in CELL_DCH state is not more than LdFactCalSrvNum(the value is decided by parameter of *BgNoiScene*: when *BgNoiScene* is 0, LdFactCalSrvNum will be 15; when *BgNoiScene* is 1, LdFactCalSrvNum will be 20; when *BgNoiScene* is 2, LdFactCalSrvNum will be 3) in a cell, initiate cell load factor measurement and decision. Cell load factor is defined as follows:

$$L = \sum \frac{EbN0 * R}{EbN0 * R + W}$$

Where, EbNo refers to the planned UL Eb/No of the service carried on DCH or non-scheduling E-DCH with values listed in the following table or scheduling E-DCH(with value of 1dB), with values listed in the table; R refers to the real-time rate measured on UL DCH or E-DCH. W refers to chip rate 3.84Mc/s. (L is converted to percentage).

Table 3-1 UL Eb/N0 of typical services

Traffic Class	Name	Uplink Traffic Eb/N0
Conversational	UL NAMR 4.75~12.2kbps	4.2
Streaming	UL PS 64kbps	1.7
Streaming	UL PS 384kbps	0.9
Streaming	UL PS 128kbps	0.9
Interactive	UL PS 64kbps	1.6
Interactive	UL PS 384kbps	0.9
Interactive	UL PS 128kbps	1.1

Traffic Class	Name	Uplink Traffic Eb/N0
Background	UL PS 64kbps	1.7
Background	UL PS 384kbps	0.1
Background	UL PS 128kbps	0.9
Streaming	UL CS 64kbps	1.7
Interactive	PS8k	6.9
Background	PS8k	6.9

If the load factor (L) is less than or equal to UnldThresh+ DeltaThr and the number of services is less than or equal to LdFactCalSrvNum for adjacent cell in current RNC, the load of the adjacent cell is deemed as “Light load”. If the automatic noise floor adjustment algorithm switch (*BckNoiseAdjSwh*) is set to “OFF”, when the difference between RTWP reported by NodeB and *OriBckNoise* is less than or equal to NoiOffsetThr for adjacent cell in current RNC, the load of the adjacent cell is deemed as “Light load”. Else the load of the adjacent cell is deemed as not “Light load”.

Notes:

a) The value of UnldThresh is decided by parameter of *BgNoiScene*: when *BgNoiScene* is 0, UnldThresh will be 3; when *BgNoiScene* is 1, UnldThresh will be 5; when *BgNoiScene* is 2, UnldThresh will be 1.

b) The value of DeltaThr is decided by parameter of *BgNoiScene*: when *BgNoiScene* is 0, DeltaThr will be 10; when *BgNoiScene* is 1, DeltaThr will be 50; when *BgNoiScene* is 2, DeltaThr will be 2.

c) The value of LdFactCalSrvNum is decided by parameter of *BgNoiScene*: when *BgNoiScene* is 0, LdFactCalSrvNum will be 15; when *BgNoiScene* is 1, LdFactCalSrvNum will be 20; when *BgNoiScene* is 2, LdFactCalSrvNum will be 3.

d) The value of NoiOffsetThr is decided by parameter of *BgNoiScene*: when *BgNoiScene* is 0, NoiOffsetThr will be 0.5; when *BgNoiScene* is 1, NoiOffsetThr will be 1; when *BgNoiScene* is 2, NoiOffsetThr will be 0.2

For the intra-frequency neighbor cells that belong to another RNC, if NRT is "light load" and RT is "light load", the load of the cell is deemed as "Light load". The NRT is deemed as "light load" if the Iur cimmon measurement report value is "low"(the value may be "low"," medium"," high" or "overloaded"). The RT is deemed as "light load" if the Iur common measurement report value is less than or equal to DRtlightldThr. If the Iur common measurement report value cannot be got, the load of the intra-frequency neighbor cells that belong to another RNC will be deemed as "light load" (In current version, Iur common measurement function is not provided) . The value of DRtlightldThr is decided by parameter of *BgNoiScene*: when *BgNoiScene* is 0, BgNoiUptSrvNum will be 8; when *BgNoiScene* is 1, BgNoiUptSrvNum will be 8; when *BgNoiScene* is 2, BgNoiUptSrvNum will be 0.

If the number of services in CELL_DCH state is less than or equal to *BgNoiUptSrvNum* and the load factor(L) is less than or equal to UnldThresh in current cell, and the load of intra-frequency adjacent cell with measurement priority (*MeasPrio (*utranRelation*)*) of 0 is "Light load", then the load of current cell borders on zero load. The value of UnldThresh is decided by parameter of *BgNoiScene*: when *BgNoiScene* is 0, UnldThresh will be 3; when *BgNoiScene* is 1, UnldThresh will be 5; when *BgNoiScene* is 2, UnldThresh will be 1.

2 Acquisition of noise floor when a cell borders on zero load:

Node B periodically reports cell RTWP (at intervals of 2s). RNC performs filtering of RTWPs and saves the latest StaWinNum filtered RTWPs in slide window(The value of StaWinNum is decided by parameter of *BgNoiScene*: when *BgNoiScene* is 0, StaWinNum will be 10; when *BgNoiScene* is 1, StaWinNum will be 1; when *BgNoiScene* is 2, StaWinNum will be 20):

[$RTWP_{20}$ ……, RTWP2, RTWP1]

The slide window and filtering strategies are as follows: each time when a new RTWP measurement report ($RTWP_{report}$) is received after initiation of noise floor update:

$$RTWP(t) = \beta * RTWP_{report} + (1-\beta) * RTWP(t-1)$$

Where, β refers to filter factor. When the reported RTWP is larger than the final value of the filtered RTWP, β is *0.2*; otherwise, it is *0.25*.

(Note: If the number of sampling points is 0 in the slide window when measurement starts, RTWP1 = RTWPreport, that is, the first sampling point is not filtered)

3 Up-adjustment of noise floor

If a cell is set up or *BckNoiseAdjSwh* value changes from “OFF” to “ON”, the original noise floor (*OriBckNoise*) is taken as current noise floor.

When cell load borders on “Zero load”, RNC initiates acquisition of noise floor: Perform RTWP filtering and saves RTWPs into slide window [$RTWP_{StaWinNum}$,……, RTWP2, RTWP1]. When the number of sampling points in the slide window is not less than or equal to StaWinNum , the average value (adopt average value for dBm) of RTWPs in the slide window is taken as target noise floor.(Notes:The value of StaWinNum is decided by parameter of *BgNoiScene*: when *BgNoiScene* is 0, StaWinNum will be 10; when *BgNoiScene* is 1, StaWinNum will be 1; when *BgNoiScene* is 2, StaWinNum will be 20)

If the current noise floor is less than the target one and the difference between target noise floor and current one is not less than or equal to *0.2dB*, and the zero-load counter is not less than EffUnldCntThr times, increase current noise floor by min (Target noise floor – Current noise floor, *3dB*).(Notes:The value of EffUnldCntThr is decided by parameter of *BgNoiScene*: when *BgNoiScene* is 0, EffUnldCntThr will be 10; when *BgNoiScene* is 1, EffUnldCntThr will be 1; when *BgNoiScene* is 2, EffUnldCntThr will be 20)

The maximal increase of noise floor(Relative to *OriBckNoise*) cannot be over *50dB*; otherwise noise floor measurement will no longer be updated.

Notes: the zero-load counter in Automatic measurement of uplink noise floor begin to count when cell become zero-load; the counter is reset to zero and RTWP slide window is set to null when cell load turn to non zero-load from zero-load or cell noise floor down-adjust,

3.1.1.3.3 Down-adjustment of noise floor

If the automatic noise floor adjustment algorithm switch (*BckNoiseAdjSwh*) is set to "ON", the basic principle for network side to perform the down-adjustment update of noise floor measurement is as follows: to decide weather the reported RTWP is less than the current noise floor, if yes, decrease the current noise floor.

➢ Down-adjustment of noise floor

If the reported RTWP is less than the cell's current noise floor, decrease the current noise floor by (the current noise floor –the reported RTWP), in other words, the new noise floor is equal to the reported RTWP.

3.1.2 DCH Admission Control

DCH admission control needs to take into account the following four factors:

- CE-based DCH admission control.
- Uplink interference-based DCH admission control.
- Downlink power-based DCH admission control.
- Downlink channelization code-based DCH admission control.

If admission control is enabled, the admission rejection of any of the above four factors may result in DCH admission rejection for the service; the service is admitted on DCH only when admission succeeds in all factors.

For RRC connection signaling, the uplink interference restriction, downlink power, Node B CE restriction, channelization code restriction and the number of RRC connection signaling restriction need to be taken into account.

3.1.2.1 CE Resource-based Admission Control

No service will be admitted in a cell in the case of insufficient Node B CE resources. Whether Node B CE resources are sufficient is judged based on the resource amount (Credit) and resource consumption amount (Cost) in IE"Local Cell Information" (or

IE"Local Cell Group Information" for cell group-based sharing of Node B resources) of Audit Response or Resource Status Indication.

- Credit report method: Judge whether CE resources are shared for uplink and downlink resources based on whether there is IE"UL Capacity Credit"IE in IE"Local Cell Information" (or IE"Local Cell Group Information" for cell group-based sharing of Node B resources) of Audit Response or Resource Status Indication.

- CE cost for Cell basic common channel is reserved by Node B. When CE admission control is decided in RNC, CE cost for Cell basic common channel is not considered; only Dedicated Channel and MBMS Channel need CE cost admission decide. CE cost value in IE "AUDIT RESPONSE" or "RESOURCE STATUS INDICATION" for common channel is only used for MBMS. CE cost accumulation is only for Dedicated Channel and MBMS Channel, CE cost for MBMS Channel is also added in Dedicated CE cost accumulation. For same carrier shared by multi-PLMN, CE cost for MBMS Channel is added to the Common PLMN. Notes: the basic common channel that Node B reserved CE includes: PSCH, SSCH, CPICH, P-CCPCH, PICH, MICH, AICH, E-AGCH, E-RGCH, E-HICH ,SCCPCH carrying PCH and FACH not used for MBMS(not including SCCPCH carrying MBMS channel) Usage of Cost: Judge whether the admission request RL is the first RL in the RLS; if not (that is, handover UE), only cost2 of RL needs to be taken into account; if so (that is, newly admitted UE), cost1 of RLS needs to be taken into account in addition to cost2. Values of Cost1 and Cost2 are related to SF. The correspondence between Cost1/Cost2 and SF originates from IE"Dedicated Channels Capacity Consumption Law" in IE"Local Cell Information" or IE"Local Cell Group Information", and indicates the amount of CE resources consumed by a dedicated channel relative to the SF.

1 Uplink and downlink adopt separate CE resources.

i UL CE resource admission decision

Uplink CE resource admission decision method:

– Check whether IE"Resource Operational State" in IE"Local Cell Information" (or IE"Local Cell Group Information" for cell group-based sharing of Node B resources) is "Enabled"; if it is "Disabled", the system resources are unavailable and the admission request will be directly rejected for the cause

"Uplink CE Resource Limit (DCH_UL_CREDIT_LIMIT)"; otherwise, proceed to next step.

– Judge whether the following equation stands up:

$$\mathrm{ULTotalCost} + \mathrm{UL\ Cost2} + \mathrm{UL\ Cost1} \le \mathrm{UL\ Capacity\ Credit}$$

Where,

ULTotalCost refers to accumulated value of uplink resource consumption

Cost1 refers to CE resources consumed by RLS.

Cost2 refers to CE resources consumed by RL, and N refers to the number of channelization codes.

CE resource admission decision for local cell group:

– If there is no link in the RLS that “RL currently set up” belongs to, the consumed CE resources contain Cost1 and Cost2, which are calculated based on the consumption rule reported by Node B.

– If there is a link in the RLS that “RL currently set up” belongs to, the consumed CE resources only contain Cost2.

CE resource admission decision for local cells: The consumed CE resources of RL currently set up always contain Cost1 and Cost2.

If the equation stands up, UL CE admission request is accepted; otherwise, it will be rejected for the cause “UL CE Resource Limit (DCH_UL_CREDIT_LIMIT)”.

ii DL CE resource admission decision

DL CE resource admission decision method:

– Check whether IE”Resource Operational State” in IE”Local Cell Information” (or IE”Local Cell Group Information” for cell group-based sharing of Node B resources) is “Enabled”; if it is “Disabled”, the system resources are unavailable and the admission request will be directly rejected for the cause

"Downlink CE Resource Limit (DCH_DL_CREDIT_LIMIT)"; otherwise, proceed to step 2.

– Judge whether the following equation stands up:

$$\text{DLTotalCost} + \text{DL Cost2} + \text{DL Cost1} \le \text{DL Or Global Capacity Credit}$$

Where,

DLTotalCost refers to accumulated value of downlink resource consumption

Cost1 refers to CE resources consumed by RLS.

Cost2 refers to CE resources consumed by RL.

CE resource admission decision for local cell group:

– If “RL currently set up” is the first link in the RLS, the consumed CE resources contain Cost1 and Cost2, which are calculated based on the consumption rule reported by Node B.

– If “RL currently set up” is not the first link in the RLS, the consumed CE resources only contain Cost2.

– CE resource admission decision for local cells: The consumed CE resources of RL currently set up always contain Cost1 and Cost2.

If the equation stands up, UL CE admission request is accepted; otherwise, it will be rejected for the cause “DL CE Resource Limit (DCH_DL_CREDIT_LIMIT)”.

2 CE resources shared by uplink and downlink

CE resource admission decision method (concurrently for uplink and downlink directions):

Check whether IE”Resource Operational State” in IE”Local Cell Information” (or IE”Local Cell Group Information” for cell group-based sharing of Node B resources) is “Enabled”; if it is “*Disabled*”, the system resources are unavailable and the admission request will be directly rejected for the cause "CE Resource Limit (DCH_ DL_CREDIT_LIMIT or DCH_ UL_CREDIT_LIMIT)"; otherwise, proceed to step 2.

Judge whether the following equation stands up:

$$\mathrm{ULTotalCost} + \mathrm{DLTotalCost} + \mathrm{ULCost2} + \mathrm{ULCost1} + \mathrm{DLCost2} + \mathrm{DLCost1} \leq \mathrm{DL\ Or\ Global\ Capacity\ Credit}$$

Where,

ULTotalCost refers to accumulated value of uplink resource consumption

DLTotalCost refers to accumulated value of downlink resource consumption

Cost1 refers to CE resources consumed by RLS.

Cost2 refers to CE resources consumed by RL.

CE resource admission decision for local cell group:

- If there is no link in the RLS that “RL currently set up” belongs to, the consumed CE resources contain Cost1 and Cost2, which are calculated based on the consumption rule reported by Node B.
- If there is a link in the RLS that “RL currently set up” belongs to, the consumed CE resources only contain Cost2.

CE resource admission decision for local cells: The consumed CE resources of RL currently set up always contain Cost1 and Cost2.

If the equation stands up, CE admission request is accepted; otherwise, it will be rejected for the cause “CE Resource Limit (DCH_ DL_CREDIT_LIMIT or DCH_ UL_CREDIT_LIMIT)”.

3.1.2.2 Uplink Interference-based Admission Control

The uplink capacity of WCDMA is usually interference-limited. The uplink capacity is limited primarily because of the increase of uplink interference power. The uplink interference decision is made by predicting the resulting uplink interference in the cell after service admission based on current uplink interference, and comparing the former with uplink admission threshold. If the resulting uplink interference is larger than admission threshold, the service request is rejected.

Uplink interference admission control procedure is as follows:

- Calculate uplink interference admission threshold:

  – $I_{threshold}$= N_0+ *DchUlAcThresh*

  – N_0 refers to uplink background and receiver noise power, which originates from OriBckNoise (*BckNoiseAdjSwh* is set to "OFF") or is obtained through automatic uplink noise floor measurement (*BckNoiseAdjSwh* is set to "ON").

  – *DchUlAcThresh* refers to uplink admission threshold (%) and can be configured in the following steps as shown in Figure 3:

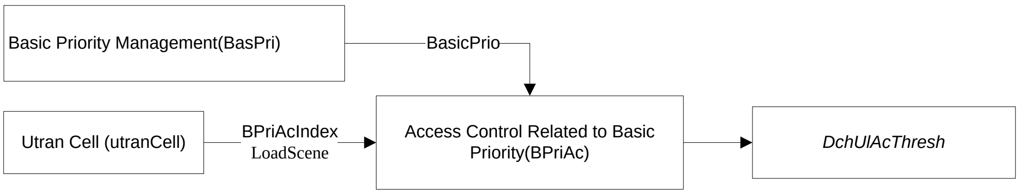
i Obtain cell *LoadScene*, *BpriAcIndex* (utranCell) from Utran Cell (utranCell).

ii Obtain service *BasicPrio* from Basic Priority Management (BasPri).

iii Obtain *DchUlAcThresh* from Access Control Related to Basic Priority (BPriAc) based on *BpriAcIndex*(BPriAc) and *BasicPrio*.

  – For configuration of BasicPrio, see ZTE UMTS QoS Feature Guide.

Figure 3-1 Configuration steps of DCH uplink admission control threshold



- Calculate interference increment ΔI

$$\Delta I(dBm) = \text{Itotal} \cdot \frac{C_L}{1-\eta-C_L},$$

Where,

– I_{total} comes from Node B common measurement (RTWP).

– η = 1 - N_0 / I_{total}

– N_0 refers to uplink background and receiver noise power, which originates from *OriBckNoise (BckNoiseAdjSwh* is set to "OFF"*)* or is obtained through automatic uplink noise floor measurement (*BckNoiseAdjSwh* is set to "ON").

– Load estimate factor $C_L = (1 + UlInterFactor) \cdot \frac{1}{1 + \frac{W}{\beta \cdot R \cdot \alpha}}$, W=3.84e6 [bit/s].

– α refers to active factor (Value: 1).

– UlInterFactor refers to the factor for uplink interference of adjacent cell on current cell.(the value is 0.5)

– β=10^((Eb/N0)/10), EbN0 refers to uplink service quality factor, with values listed in Table 3-1.

– R refers to target rate at which a service is admitted.

If more than one traffic are accessed between two measurement reports, the load increment from the accessed traffic should be cumulated as the total ΔI ; if traffic is released between two measurement reports, the load decrease from the released traffic should be discounted from the cell load.

- Uplink interference admission decision:

  If I_{total} +ΔI >$I_{threshold}$, the cell is interference restricted after admittance of new service, so the new service is rejected for the cause "DCH Uplink Interference Limit (DCH_UL_RTWP_LIMIT)".

  If I_{total} +ΔI <=$I_{threshold}$, the cell is not interference-restricted after admittance of new service; the new service is admitted.

  Where, ΔI and $I_{threshold}$ are obtained through the above calculation.

3.1.2.3 Downlink Power-based Admission Control

The maximum transmit power of a cell is one of the capabilities of Node B and one of the basic conditions to limit downlink capacity as well. The downlink interference decision is made by predicting the resulting downlink interference in the cell after service admission based on current downlink interference, and comparing the former with downlink admission threshold. If the resulting downlink interference is larger than admission threshold, the service request is rejected.

Downlink interference admission control procedure is as follows:

- Calculate downlink power admission threshold:
  - $P_{threshold}$= MAXDlTxPwr* DchDlAcThresh
  - *MAXDlTxPwr* refers to the maximum downlink transmit power (dBm) of the cell.
  - *DchUlAcThresh* refers to downlink admission threshold (%) and can be configured in the following steps as shown in Figure 4:

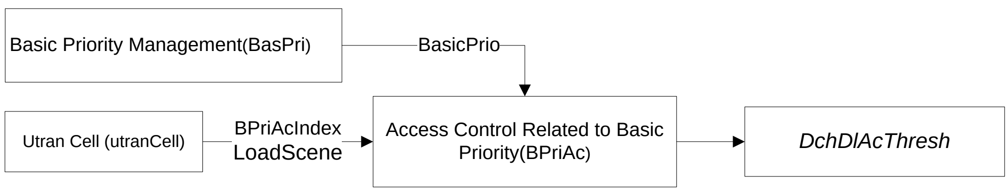
i Obtain cell *LoadScene*, *BpriAcIndex* (utranCell) from Utran Cell (utranCell).

ii Obtain service *BasicPrio* from Basic Priority Management (BasPri).

iii Obtain *DchUlAcThresh* from Access Control Related to Basic Priority (BPriAc) based on *BpriAcIndex*(BPriAc) and *BasicPrio*.

- For configuration of BasicPrio, see ZTE UMTS QoS Feature Guide.

Figure 3-2 Configuration steps of DCH downlink admission control threshold



Predict power increment ΔP[mW]:

$$\Delta P = Para1 \cdot \frac{\beta}{PG} \cdot \left[\frac{PcpichPwr}{E_{c\text{-}cpich}/N_0} - \left(\alpha_{min} + \frac{\alpha_{max} - \alpha_{min}}{1 + k \cdot 10^{\frac{L_S - k1}{k2}}} \right) \cdot P_{total} \right]$$

Where,

– $Para1$= (1+γ); γ refers to power ramp factor (0.1 for ARM voice services; and 0.2 for the rest classes of services).

– β=10^((Eb/N0)/10). Eb/N0 refers to quality factor of downlink services, with values listed in the table:

Table 3-2 DL Eb/N0 of typical services

Traffic Class	Name	Downlink Traffic Eb/N0
Conversational	DL NAMR4.75k~12.2k	7.5
Streaming	PS64k	1.7
Streaming	PS384k	0.9
Streaming	PS128k	0.9
Interactive	PS64k	4.8
Interactive	PS384k	0.9
Interactive	PS128k	4.5
Background	PS64k	1.7
Background	PS384k	4.7
Background	PS128k	0.9
Streaming	CS64k	1.7
Interactive	PS8k	6.9
Background	PS8k	6.9

– PG refers to service processing gain (dB) (PG=W/R, R refers to target rate at which a service is admitted,W =3.84M)

– $PcpichPwr$ refers to PCPICH transmit power (dBm).

– $E_{c\text{-}cpich}/N_0$ refers to PCPICH Ec/N0(dB) (for blind handover based on "Overlap" or "Covers" (*ShareCover*), the CPICH RSCP/ CPICH Ec/N0/PATHLOSS value of the target cell is the same as that of the source cell). reported from UE. UE-reported EcNo is stored in RNC and valid within *65535s;* if valid Cpich Ec/N0 is unavailable during admission decision, the default value of *CpichEcN0* is used.

– α min refers to lower threshold for downlink orthogonal factor (*0.1*).

– α max refers to upper threshold for the downlink orthogonal factor (*MaxOrthogFactor*).

– k refers to coefficient factor, which is 0.01 constantly.

– P_{total} is downlink effective load(mW): it can be obtained from Node B common measurement report(For R99 Cell: TCP; For HS Cell: HS-DSCH Required Power, Transmitted carrier power of all codes not used for HS ($\mathrm{NOHSDSCHPower} + \sum_{\mathrm{Spi}=0}^{\mathrm{MaxSpi}} \mathrm{HSDSCHRequiredPower}_{\mathrm{Spi}}$)).

– L_S refers to path loss, which can be obtained from the measurement quantity reported by UE (L_S related measurement result reported by UE is stored in RNC and valid within *65535s*) (for blind handover based on "Overlap" or "Covers" (*ShareCover*), the CPICH RSCP/ CPICH Ec/N0/PATHLOSS value of the target cell is the same as that of the source cell); if L_S cannot be obtained from UE-reported measurement quantity, take *PathLoss* as the value of L_S.

Principle for obtaining L_S from UE-reported measurement quantity:

If UE reports Pathloss in the measurement result, $L_S = Value_{pathloss}$.

If UE reports RSCP in the measurement result, then $L_S = PcpichPwr - Value_{RSCP}$;

$PcpichPwr$ refers to PCPICH transmit power.

– k1 and k2 refer to scenario parameters. The scenarios are controlled by the parameter *CellScen* configured in OMC, including “Dense City Zone”, “ Generic City Zone”, “ Suburb”, and “ Country”. Different scenarios correspond to different k1 and k2 parameters. Specific values of k1 and k2 parameters are listed in the table.

Table 3-3 Scenario parameters in downlink power admission control

Densely-populated urban area	**Common urban area**	**Suburbs**	**Countryside**
K1= -32.9116	K1=-53.5116	K1=-51.1716	K1=-48.8116
K2=-33.5849	K2=-25.8549	K2=-22.8249	K2=-21.5249

If ΔP < *PcpichPwr* + *MinDlDpchPwr*, then ΔP =*PcpichPwr* + *MinDlDpchPwr*.if ΔP > *PcpichPwr* + *MaxDlDpchPwr*, then ΔP = *PcpichPwr* + *MaxDlDpchPwr*. For details about obtaining *MinDlDpchPwr*, *MaxDlDpchPwr*, see *ZTE UMTS Power Control Feature Guide*.

If there are several services requesting admission concurrently within a TCP measurement report period, then the admission control needs to predict power increment ΔP and accumulate it into total ΔP for these services; if traffic is released between two measurement reports, the load decrease from the released traffic should be discounted from the cell load.

– Note: dBm is transfered into mW during calculation, which is then transfered back to dBm after calculation.

- Downlink power admission decision:

If P_{total} +ΔP>$P_{threshold}$, the cell is power restricted after admittance of new service, so the new service is rejected for the cause “DCH Downlink Power Limit (DCH_DL_TCP_LIMIT)”.

If P_{total} +ΔP <=$P_{threshold}$, the cell is not power-restricted after admittance of new service; the new service is admitted.

Where,

P_{total} is downlink effective load(mW): it can be obtained from Node B common measurement report(For R99 Cell: TCP; For HS Cell: HS-DSCH Required Power, Transmitted carrier power of all codes not used for HS ($NOHSDSCHPower + \sum_{Spi=0}^{MaxSpi} HSDSCHRequiredPower_{Spi}$)).

ΔP and $P_{threshold}$ are obtained from the above calculation.

3.1.2.4 Downlink Channelization Code-based Admission Control

WCDMA downlink adopts the OVSF channelization codes (that is, spreading codes) to differentiate various channels. In view of the features of OVSF code tree, the precondition for a tree node to be allocated: The father node and nodes above it as well as the sub-node and nodes below it are all unoccupied. When new cell resources requested by a service necessitate allocation of channelization code resources, RNC needs to allocate appropriate code word for the service based on the SF required by it. Furthermore, RNC also needs to allow for reservation of some code resources for UEs with high priority to access system preferentially.

If a service requests downlink channelization code resources, and all nodes relative to the SF required by the service in OVSF code tree cannot be allocated, then the admission decision will be “Code Resource Limit”, and the service request will be rejected; otherwise, if *DlCacSwitch* is set to “OFF”, channelization code admission is accepted;else, RNC then judges: whether the number of channelization codes left in the code table after channelization code allocation is larger than specified reservation threshold (*CodeTreeResRto*); if so, channelization code admission is accepted; otherwise, it will be rejected for the cause of “Code Resource Limit (DCH_NO_CHCODE)”.

Where, Code Resource Reservation Threshold (*CodeTreeResRto*) is configured based on basic priority. The basic priority is obtained by querying the basic priority mapping table based on the ARP and service class in the RAB assignment request. For details, see *ZTE UMTS QoS Feature Guide*.

3.1.2.5 UE RLC Capability-based Admission Control

During RB setup or reconfiguration, the configuration of UE RLC radio access capability parameter cannot exceed UE capability:

3.1.2.5.1 Maximum number of AM entities:

Total number of RLC AM entities cannot exceed UE capability “Maximum number of AM entities”: If the total number of RLC AM entities which already carry services is less than reported UE capability “Maximum number of AM entities”, a new service can be admitted; if the total number of RLC AM entities which already carry services is equal to the reported UE capability “Maximum number of AM entities”, a new service will be rejected; this capability judgment is mainly used during setup of concurrent services.

If $N_{RLCAMold}+N_{RLCAMnew}\leq N_{RLCAMmax}$, the service will be successfully established.

Otherwise, it will be rejected ($N_{RLCAMold} + N_{RLCAMnew} > N_{RLCAMmax}$)

Where,

$N_{RLCAMold}$ refers to the number of RLC AM entities which already carry services.

$N_{RLCAMnew}$ refers to the number of new RLC AM entities.

$N_{RLCAMmax}$ refers to UE capability “Maximum number of AM entities”.

3.1.2.5.2 **Maximum** RLC **AM Window Size**

For service in CELL_DCH state, the RLC window (The following table lists the correspondence between rate and RLC window) relative to the reference Bit Rate for radio bearer should be less than the UE capability “Maximum RLC AM Window Size”. The reference Bit Rate for radio bearer is got based on “Reference Bit Rate Decision for Radio Bearer”.

Correspondence between service(AM mode) rate and RLC window (For configuration of *TimeDelay*, see *ZTE UMTS RAN Transmission Overview Feature Guide*).

Rate (bps)	Transmit/Receive window(TxWS/RxWS) (PDUs) with varied transmission delay (*TimeDelay*)		
	20ms	100ms	250ms
3.4k signaling	64	64	64
64k	256	256	256
128k	512	512	512
384k	512	1024	2047
512k	768	1536	2560
768k	512	1536	2047
900k	512	1536	2047
1024k	768	1536	2047
1200k	768	1536	2047
1800k	1024	2047	2047
2048k	1024	2047	2047
4096k	2047	2047	2047
7200k	2047	2047	2047
10100k	2047	2047	2047
14000k	2047	2047	2047

3.1.2.5.3 Total RLC AM and MAC-hs buffer size

The buffer size of all uplink and downlink services shall not be over "Total RLC AM and MAC-hs buffer size" in UE capability.

For the i^{th} AM mode RB: $TxWS_i$ refers to uplink RLC transmit window; $UPduS_i$ refers to uplink PDU size (exclusive of AM PDU header); $RxWS_i$ refers to downlink receive window; $DPduS_i$ refers to downlink PDU size (exclusive of AM PDU header); N refers to the number of RLC AM entities configured in UE, current AM PLC buffer size $BSize_{old}$ is given by the following equation:

$$BSize_{old} = \sum_{i=1}^{N} TxWS_i \times UPduS_i + \sum_{i=1}^{N} RxWS_i \times DPduS_i$$

For the m[th] UM mode RB which is setup on HS-DSCH in CELL_DCH state, Gbr_m is the Guaranteed Bit Rate of the service, $MachsWinSize_m$ is the MAC-hs Window Size of the service priority queue, the minimal UM_Reordering buffer requirement of the total RLC UM HS-DSCH service is:

$$MinUMReorderBuffReq=min(300, ceil(\sum_{m=1}^{M} UMReorderBuffReqm /1024/8))kByte$$

(Notes: the value range of MAC-hs Reordering Buffer Size for RLC-UM in 3GPP is (0..300,…)kBytes, so min(300, …)is needed), in which: $UMReorderBuffReq_m = Gbr_m *2*0.001*MachsWinSize_m$,

- Setup of new AM Mode RB: $BSize_{total}$ refers to the “Total RLC AM and MAC-hs buffer size” in UE capability; $TxWS_{new}$ and $RxWS_{new}$ respectively refer to uplink transmit and downlink receive window sizes of new RB; $UPduS_{new}$ and $DPduS_{new}$ respectively refer to the uplink and downlink PUD sizes (exclusive of AM PDU header) of new RB.

If $BSize_{total} - BSize_{old} - MinUMReorderBuffReq \geq TxWS_{new} \times UPduS_{new} + RxWS_{new} \times DPduS_{new}$, then the RB RLC Buffer admission is successful. Otherwise, the “Reference Bit Rate Decision for Radio Bearer” rules will be used to degrade the RLC window.

- Setup of new UM mode RB which is setup on HS-DSCH in CELL_DCH state, if $BSize_{total} - BSize_{old} - MinUMReorderBuffReq_{new} \geq 0$, then the RB RLC Buffer admission is successful. Otherwise, the “Reference Bit Rate Decision for Radio Bearer” rules will be used to degrade the RLC window.

3.1.2.5.4 Reference Bit Rate Decision for Radio Bearer

For new service (including RAB SETUP and RAB Modify), use the he RLC parameter of the reference bit rate to calculate whether UE “Maximum RLC AM Window Size” and “Total RLC AM and MAC-hs buffer size” capability is limited or not. When UE “Maximum RLC AM Window Size” or “Total RLC AM and MAC-hs buffer size” capability limited, data rate are downgrade for both old service and new service to re-calculate whether UE “Total RLC AM and MAC-hs buffer size” capability is limited or not. That means, the following data rate with different RLC parameters are attempted step by step for new service and old service until the new service be admitted:

(1) new service: maximal reference rate; on-line service: current reference rate

(2) new service: 1/2 maximal reference rate; on-line service: min(1/2 maximal reference rate, current reference rate)

(3) new service: 1/6 maximal reference rate; on-line service: min(1/6 maximal reference rate, current reference rate)

(4) new service: the minimum rate level of DRBC; on-line service: min(the minimum rate level of DRBC, current reference rate)

the reference rate upgrade scenario:

(1) service release: if PS released, then the left PS of the UE with the highest BP and RLC reference rate lower than maximal reference rate will be selected to upgrade the reference(if more than one PS satisfied, the one with less reference rate will be selected; if more than one, any one will be selected): firstly attempted to upgrade to maximal reference rate, if limited, attempted to upgrade to max(1/2 maximal reference rate, current reference rate); if limited, attempted to upgrade to max(1/6 maximal reference rate, current reference rate); if limited still, stop to upgrade

(2) Event 4A triggered: for event 4A, firstly attempted to upgrade to maximal reference rate, if limited, attempted to upgrade to max(1/2 maximal reference rate, current reference rate); if limited, attempted to upgrade to max(1/6 maximal reference rate, current reference rate); if limited still, stop to upgrade(Notes:only for Event 4A HS/E and HS/D)

Notes: when downgrading to 1/2, 1/6 maximal reference rate or the minimum rate level of DRBC, UL and DL are both downgraded for HS/E and D/D, DL only is downgraded for HS//D,

In which, maximal reference rate is calculated as following:

For R6 UE: min(MaxBR, maximal rate that UE supported) for both UL and DL

For R5 UE: min(MaxBR, maximal rate that UE supported) for DL, min(MaxBR, the maximal rate level of DRBC) for UL

For R99 UE: min(MaxBR, the maximal rate level of DRBC) for both UL and DL

The minimal rate of DRBC =min(max(the minimum rate level of DRBC, GBR), MaxBR), In which, GBR comes from GBR of RAB used for streaming traffic class; GBR us 0 for interactive and background traffic class, MaxBR comes from the maximal bit rate of RAB ASSIGNMENT and RAB Negotiation.

Table 3-4 lists the correspondence between service rate and RLC window.

Note:

- For R99 services, the maximum DCH rate allowed is only 384K.
- If the MBR of a downlink service carried on DCH is higher than 384kbps, the parameter relative to 384kbps is taken as RLC parameter; if it is less than 384kbps, the parameter relative to MBR is taken as RLC parameter.

Table 3-4 Correspondence between service(AM mode) rate and RLC PDU SIZE.

BitRate(bps)	UPduS	DPduS
Less or equal to 3.65Mbps	336	336
Larger than 3.65Mbps	656	656

3.1.2.6 UE Number-based Admission Control

For Cell_DCH state, only RRC CONNECTION SETUP(CELL_DCH 3.4k, 13.6k, 27.2k signaling)is restricted by User Number. If the RRC CONNECTION signaling in Cell_DCH state is larger than or equal to *RrcSigUsrNumThr*, new RRC CONNECTION SETUP signaling only will be refused to access to the cell on CELL_DCH state for restricted by User Number; else the new RRC CONNECTION SETUP is not restricted on CELL_DCH state by User Number.

3.1.3 Admission Control of Emergency Calls

Emergency calls shall have higher priority than all non-emergency calls. Emergency calls must be successfully admitted by all means at all time, requiring only hard resource (code word and CE resources) decision instead of soft resource admission decision.

If the “CAUSE” in the RRC CONNECTION REQUEST message received by RNC from UE is “Emergency Call”, RNC directly allocates radio resources and establishes RRC connection. If the downlink channelization codes or CE resources are restricted, the measures to be used, is described in *ZTE UMTS Power Control Feature Guide*.

3.1.4 AMR Traffic Re-admission after AMR Rate Decrease while soft resources limited

When uplink/downlink AMR access with MaxBR:

If access refused by hard resource(i.e. WALSHCODE, CE), then congestion will be triggered as the MaxBR

If access refused by soft resource(i.e. downlink power, uplink interference):

- If *AmrDnRateAcSwch* is opened, then Min bit rate from RAB Assignment Request (if the data rate set from RAB Assignment Request is not discounted by RNC, the Min bit rate means the GBR; else, the Min bit rate will be the min rate of not less than GBR in the discounted rate set) will be used to attempt Re-admission
  - If it can be accessed, then uplink TFC Control will be performed for the UE and downlink data rate control will be performed by Iu signalling.(Notes: AMR date rate increasment may perform as the description in <ZTE UMTS AMR-NB & AMR-WB Feature Guide V3.1.doc>)
  - If it can not be accessed, then congestion will be triggered as the MaxBR
- If *AmrDnRateAcSwch* is closed, then congestion will be triggered as the MaxBR

Notes: if *AmrRncAdjust* is not opened, the data rate of AMR will not increase.

3.1.5 FACH Admission Control

3.1.5.1 FACH Load-related Measurement

"UE Active Factor" is introduced for RNC user plane to measure FACH load and periodically report it to RNC control plane. User plane measurement actually refers to measurement of relative data rate of UE in CELL_FACH state within related measurement period, with measurement method as follows:

- Define the size Slide_Window_Size (280 ms) of slide window used to indicate whether UE in CELL_FACH state is active.
- The "User Buffer Size" in the first resource allocation request frame (FACH CAPACITY REQUEST or FACH DATA FRAME, hereunder the same) of UE_i recorded by the user plane at intervals of flow control period (value: 80 ms) in the slide window (Slide_Window_Size) is $\mathrm{UserBufferSize}_{\mathrm{iFirst}}$, and "User Buffer Size" in the last resource allocation request frame ((FACH CAPACITY REQUEST or FACH DATA FRAME) of UE_i in the slide window is $\mathrm{UserBufferSize}_{\mathrm{iLast}}$.
- User plane calculates the average data rate $BitRate_i$ of SDUs received by MAC-C entities from UE_i in the slide window (Slide_Window_Size) during FACH admission or load balance decision:
- For each UE_i in CELL_FACH state, user plane calculates active factor (LA) through the following equation during FACH admission or load balance decision:

  UE_i active factor (LA_i) =

$$\begin{cases} 1, \quad \text{if} \quad \dfrac{(\mathrm{UserBufferSize}_{iLast} - \mathrm{UserBufferSize}_{iFirst})*8}{0.28s - 0.08s} > 200\mathrm{Kbps} \\ \min\left(1, \dfrac{\mathrm{BitRate}_i \text{ received by MAC-C}}{1000\mathrm{Kbps}}\right), \quad \text{else} \end{cases}$$

- Current FACH load = $\sum_{i=1}^{N} \mathrm{LA_i}$

Where, N refers to the total number of active UEs that are in CELL_FACH state and have DTCHs.

LA_i refers to the active factor of active UEi in CELL_FACH state.

3.1.5.2 FACH capacity evaluation

The parameter "UE Active Factor" is defined to evaluate FACH load and measure relative data rate of UEs in CELL_FACH state. For details, see related definition in "FACH Load-Related Measurement". The parameter "Maximum SCCPCH Active Factor" is defined to measure FACH capacity. Maximum SCCPCH active factor refers to the relative values of maximum transmission rate of SCCPCH carrying FACH and minimum rate allowed by FACH admission threshold.

$$FACHCacLA_{SCCPCH} = \frac{\text{Total Transmit Bit Rate for the same SCCPCH}}{1000\text{Kbps}}$$

Where, $FACHCacLA_{SCCPCH}$ refers to the maximum active factor of SCCPCH;

3.1.5.3 FACH Admission Decision

If a service is to be carried on FACH, RNC judges whether the following formula is met when making admission decision:

$$FACHCacLA_{SCCPCH} >= \sum_{i=1}^{N} LA_i \quad \text{(See FACH Load/Capacity-related Measurement)}$$

If the formula is met, the service is admitted; otherwise, it is rejected.

3.1.6 Processing upon Admission Rejection

For different services and different QoS levels, the requested service shall not be directly rejected as a result of cell resource insufficiency; instead; the system needs to perform forced disconnection, queuing and re-scheduling policies for the service based on its delay requirement and priority to improve connection rate. For details, see *ZTE UMTS Congestion Control Feature Guide*.

3.2 HSDPA Admission Control

3.2.1 Related Measurement

3.2.1.1 Node B common measurement

1 Downlink power measurement

HS-DSCH downlink power admission control necessitates Node B common measurement information related to HSDPA power, including HS-DSCH Required Power, and Transmitted carrier power of all codes not used for HS-PDSCH or HS-SCCH transmission (similar to TCP for R99). Therefore, common measurement regarding “HS-DSCH Required Power”, and “Transmitted carrier power of all codes not used for HS-PDSCH or HS-SCCH transmission” must be initiated concurrently in HSDPA-capable cells. The measurement and modify methods are the same as R99 RTWP and TCP initiation and modify methods. But prior to initiation, perform the following judgment:

i Cell attribute (*HspaSptMeth*(utranRelation) is “Support HSDPA and DCH”, “Support Only HSDPA”, “Support HSUPA, HSDPA and DCH”, or “Support HSUPA and HSDPA”.

ii HSDPA resources (indicates whether to allocate HS-PDSCH and HS-SCCH resources) are allocated and established.

The period of all above common measurement is controlled by parameters of *RptPrdUnit*(NbCom) and *RptPrd*(NbCom).

3.2.2 HS-DSCH Admission Control

Admission control must be exercised for any service request, including RAB setup or modification, relocation, handover, and channel change, if HS-DSCH resources need to be used. If a cell supports both HSDPA and R99 services, the impact on DCH admission algorithm also needs to be taken into account.

3.2.2.1 Node B Support Capability-based Admission Control

Node B can carry HS-DSCH Resources Information→ Resource Operational State and HSDPA Capability in AUDIT RESPONSE message; if HS-DSCH Resources Information→ Resource Operational State is “Disabled” or HSDPA Capability is “HSDPA non Capable”, HS-DSCH in related cell will reject the new service request for the cause “Node B Support Capability Limit (HS_NOT_AVAILABLE)”.

3.2.2.2 UE Numbers-based Admission Control

Sharing of HS-DSCH among an excessive number of UEs may result in the decrease of average UE QoS. Although theoretically speaking, a single cell supports access of a maximum of 230 HSDPA UEs, yet in that case the average throughput per UE is less than 10Kbps, which is nonsensical for bearer service in practice; if a cell has 64 HSDPA UEs accessed, then the average throughput per UE is about 100Kbps. Operators can appropriately set the maximum number of UEs (*HsdschTrafLimit*) that can be carried on HS-DSCH in each cell. New HS-DSCH UEs are not admitted for the cause “HS-DSCH UE Numbers Limit (HS_USER_LIMIT)” if the resulting number of UEs carried on HS-DSCH exceeds *HsdschTrafLimit;* otherwise, they are admitted.

3.2.2.3 Data Throughput-based Admission Control

Air interface data throughput limit must be taken into account.

Air interface data throughput admission decision procedure:

- Each time after admitting a UE, RNC accumulates the guaranteed bit rate of the UE. $\text{TatalRate} = \sum_{i=1}^{\text{NumS}} \text{MachsGuaranteedBitRate}_i$; where, TotalRate refers to summation of guaranteed rates of accessed UEs; $\text{MachsGuaranteedBitRate}_i$ refers to guaranteed rate of each UE and i refers to the number of UEs (i = 1…NumS, NumS); When a HS-DSCH UE is released or changes into DCH state, the rate of the UE needs to be deducted from TotalRate.

- When a new UE requests resource allocation, the admission control makes decision based on the following formula:

$$\text{TotalRate} + \text{New Machs Guaranteed Bit Rate} > \text{Threshold for data throughput carried on H}$$

. If the formula is met, the new UE is not admitted on HS-DSCH for the cause “HS Throughput Limit (HS_TRAFFICVOL_LIMIT)”; otherwise, it is admitted.

Where, Threshold for data throughput carried on HS-DSCH = *HspdschBitRate* (available transmit rate of one HS-PDSCH) × The number of HS-PDSCHs configured in the cell.

3.2.2.4 Downlink Power-based Admission Control

HS-DSCH and DCH have similar downlink power-based admission control procedures except for the following differences:

1 Calculate HS-DSCH downlink power admission threshold:

$P_{threshold}$= MAXDlTxPwr* HsdpaAcThresh;

– Where,

– *MAXDlTxPwr* refers to the maximum transmit power of cell.

– *HsdpaAcThresh* refers to HSDPA downlink admission threshold (%) and can be configured in the following steps:

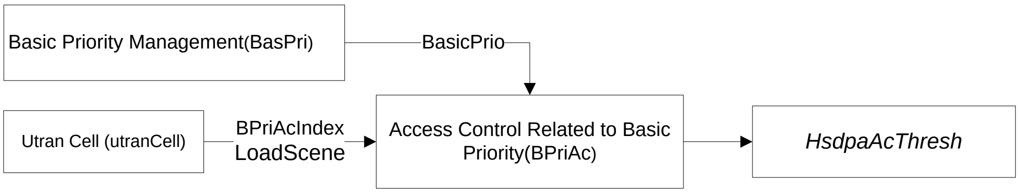
Obtain cell *LoadScene*, *BpriAcIndex*(utranCell) from Utran Cell (utranCell).

Obtain service *BasicPrio* from Basic Priority Management(BasPri).

Obtain *HsdpaAcThresh* from Access Control Related to Basic Priority (BPriAc) based on *BpriAcIndex*(BPriAc) and *BasicPrio*.

For configuration of *BasicPrio*, see *ZTE UMTS QoS Feature Guide*.

Figure 3-3 Configuration steps of HSDPA admission control threshold



2 Predict power increment ΔP[mW] (The following equation only applies to GBR services; for I/Background services, assign 0 to ΔP).

$$\Delta P = Para1 \cdot \frac{\beta}{PG} \cdot \left[\frac{PcpichPwr}{E_{c\text{-}cpich}/N_0} - \left(\alpha_{min} + \frac{\alpha_{max} - \alpha_{min}}{1 + k \cdot 10^{\frac{L_S - k1}{k2}}} \right) \cdot P_{total} \right]$$

Where,

– $Para1$=(1+γ); γ refers to power ramp factor (0.1 for ARM voice services; and 0.2 for the rest classes of services).

– $\beta=10^{\wedge((Eb/N0)/10}$; Eb/N0 is 1dB of HS-DSCH.

– PG refers to service processing gain (dB) (PG=W/R, R= GBR,W =3.84M)

– $PcpichPwr$ refers to PCPICH transmit power (dBm).

– $E_{c\text{-}cpich}/N_0$ refers to PCPICH Ec/N0(dB)(for blind handover based on "Overlap" or "Covers" (*ShareCover*), the CPICH RSCP/ CPICH Ec/N0/PATHLOSS value of the target cell is the same as that of the source cell.) reported from UE. UE-reported EcNo is stored in RNC and valid within *65535s*; if valid Cpich Ec/N0 is unavailable during admission decision, the default value of *CpichEcN0* is adopted.

– α min refers to lower threshold for the downlink orthogonal factor (*0.1*).

– α max refers to upper threshold for the downlink orthogonal factor (*MaxOrthogFactor*).

– k refers to coefficient factor, which is 0.01 constantly.

– P_{total} is the valid load of TCP, and obtained through Node B common measurement report of HS-DSCH Required Power and Transmitted carrier power of all codes not used for HS ($NOHSDSCHPower + \sum_{Spi=0}^{MaxSpi} HSDSCHRequiredPower_{Spi}$).

– L_S refers to path loss, which can be obtained from the measurement quantity reported by UE (L_S related measurement quantity reported by UE is stored in RNC and valid within *65535s*)(for blind handover based on "Overlap" or "Covers" (*ShareCover*), the CPICH RSCP/ CPICH Ec/N0/PATHLOSS value of the target cell is the same as that of the source cell.); if L_S cannot be obtained from UE-reported measurement quantity, take *PathLoss* as the value of L_S.

Principle for obtaining L_S from UE-reported measurement quantity:

If UE reports Pathloss in the measurement result, $L_S=Value_{pathloss.}$

If UE reports RSCP in the measurement result, then $L_S= PcpichPwr - Value_{RSCP}$;

$PcpichPwr$ refers to PCPICH transmit power.

– k1 and k2 refer to scenario parameters. The scenarios are controlled by the parameter CellScen configured in OMC, including densely-populated urban area, common urban area, suburbs, and countryside. Different scenarios correspond to different k1 and k2 parameters. Specific values of k1 and k2 parameters are listed in Table 3.

If ΔP < *PcpichPwr* + (-10dBm), then ΔP = *PcpichPwr* + (-10dBm).

3 HS-DSCH downlink power admission decision

If HSDPA power is allocated by RNC(*HsdschTotPwrMeth*) and HS-PDSCH, HS-SCCH, E-AGCH, E-RGCH and E-HICH Total Power allocated by RNC <

max(MinHsdpaTotalPower, $\Delta P + \sum_{Spi=0}^{MaxSpi} HSDSCHRequiredPower_{Spi}$),

then HS-DSCH downlink power admission control rejects the service request; otherwise it admits the service request.

If HSDPA is randomly allocated by Node B(*HsdschTotPwrMeth*), and,

$$\Delta P + NOHSDSCHPower + \sum_{Spi=0}^{MaxSpi} HSDSCHRequiredPower_{Spi} > P_{threshold}$$

then HS-DSCH downlink power admission control rejects the service request for the cause “Downlink Power Limit (HS_RQDPWR_LIMIT)”; otherwise, it admits the service request.

Where: MinHsdpaTotalPower= *MAXDlTxPwr* MinHspaPwrRto*.

$NOHSDSCHPower$ and $HSDSCHRequiredPower_{Spi}$ comes from NodeB common measurement report.

If there are several GBR services requesting admission concurrently within a TCP measurement report period, then the admission control needs to predict power increment ΔP and accumulate it into total ΔP for these services; if traffic is released between two measurement reports, the load decrease from the released traffic should be discounted from the cell load.

3.2.3 Admission Control of Associated DPCH Carrying Signaling

3.2.3.1 Downlink Channelization Code-based Admission Control

While using HS-DSCH to carry services, HSDPA UEs also need Associated DPCH (A-DPCH) to carry RRC signaling and power control information. SF 256 is used for A-DPCH, so the code resources are still limited for A-DPCH. Though F-DPCH is introduced in R6 so that 10 HSDPA UEs can share one OVSF code word with SF of 256, yet code resources may still be limited when there is excessive number of UEs, especially in cases where HSDPA and R99 services share carrier frequency. The A-DPCH downlink channelization code-based admission decision is the same with R99.

3.2.4 Impact on DCH Admission Control

3.2.4.1 Downlink Power-based Admission Control

1 HSPA cell downlink load acquisition mode:

RNC evaluates the downlink load (TCP_Load) of current cell based on Transmitted carrier power of all codes not used for HS-PDSCH or HS-SCCH transmission and HS-DSCH Required Power reported by Node B.

$$\mathrm{TCP\_Load} = \mathrm{NOHSDSCHPower} + \sum_{\mathrm{Spi}=0}^{\mathrm{MaxSpi}} \mathrm{HSDSCHRequiredPower}_{\mathrm{Spi}}$$

Where,

NOHSDSCHPower: Refers to Transmitted carrier power of all codes not used for HS-PDSCH or HS-SCCH transmission reported by Node B.

$\mathrm{HSDSCHRequiredPower}_{\mathrm{Spi}}$ refers to HS-DSCH Required Power relative to each scheduling priority in current cell.

2 DCH downlink power admission decision method of HSPA cell.

- If there is no hs UE, the admission decision formula is the same with that of R99. The admission threshold is also the same with that of R99.
- If there is HS-DSCH UE in HSDPA cell, DCH admission decision formula is as follows:

If the *HsdpaAcThresh* is higher than *DchDlAcThresh*:

If $NOHSDSCHPower + \Delta P <= MaxDlTxPwr * DchDlAcThreshold$ and

$$NOHSDSCHPower + \Delta P + \max(\sum_{Spi=0}^{MaxSpi} HSDSCHRequiredPower_{Spi}, \mathit{MinHsdpaTotalPower})$$
$$<= \mathit{MaxDlTxPwr} * \mathit{HspdaAcThreshold}$$

the new UE is admitted; otherwise, it is rejected.

If the admission threshold of R99 is higher than that of HS:

If $\mathit{NOHSDSCHPower} + \Delta P <= \mathit{MaxDlTxPwr} * \mathit{DchDlAcThreshold}$ is met, and

$$NOHSDSCHPower + \Delta P + \max(\sum_{Spi=0}^{MaxSpi} HSDSCHRequiredPower_{Spi}, \mathit{MinHsdpaTotalPower})$$
$$<= \mathit{MaxDlTxPwr} * (\mathit{NodeBSafeThr} - \mathit{SafePowerOffset})$$

the new UE is admitted; otherwise, it is rejected.

Where,

"*NodeBSafeThr*" is the parameter "Safe Threshold for Node B to Use HSDPA Power Freely (*Node BSafeThr*)" in OMC.

"*SafePowerOffset*" is the parameter "Node B Safe Admission Threshold Offset When DCH Admission Priority in HS Cell is Higher Than HS Priority (*SafePwrOfst*)" in OMC.

ΔP refers to DCH power increment prediction.

3.2.5 UE RLC Capability-based Admission Control

During RB setup or reconfiguration, the configuration of UE RLC radio access capability parameter cannot exceed UE capability:

1 Maximum number of AM entities:

Same as R99.

2 Maximum RLC AM Window Size

Same as R99.

3 Total RLC AM and MAC-hs buffer size

Same as R99.

Note:

When a downlink service is carried on HS-DSCH, RLC parameter of the service relative to MaxBR is adopted.

When downlink DCH and HS-DSCH are concurrently present in a cell, the maximum rate of a service that can be carried on DPCH is relevant to UE capability and obtained from the capability information reported by UE.

3.2.6 F-DPCH admission control

F-DPCH does not impact for HSDPA admission control. For one F-DPCH can be used by several HSDPA users, only downlink channel code and CE admission control are needed for F-DPCH.

3.2.6.1 Downlink channel code admission control for F-DPCH

Same as DCH downlink channel code admission control

3.2.6.2 CE admission control for F-DPCH

CE cost for F-DPCH is following:

(1) CE for F-DPCH is cost by UE, CE cost for every UE with F-DPCH is the cost value corresponding to SF=256 in IE “AUDIT RESPONSE” or “RESOURCE STATUS INDICATION”. For more than one UEs mapped on one F-DPCH, CE cost is the total cost by all UEs.

(2) For UE released, the CE cost by this UE will be released,.

The other rules for F-DPCH CE admission control is the same as downlink CE admission control for DCH.

3.2.7 Processing upon Admission Rejection

For different services and different QoS levels, the requested service shall not be directly rejected as a result of cell resource insufficiency; The system needs to perform forced disconnection, queuing and re-scheduling policies for the service based on its delay requirement and priority to improve connection rate. For details, see *ZTE UMTS Congestion Control Feature Guide*.

3.3 HSUPA Admission Control

3.3.1 Related Measurement

3.3.1.1 Node B common measurement

- Measurement of uplink interference

  To perform E-DCH admission control in a HSUPA-capable cell, Node B needs to periodically report HSUPA interference-related common measurement information: RSEPS(RTWP*).

  The common measurement report period of RSEPS(RTWP*) is controlled by parameters of *RptPrdUnit*(NbCom) and *RptPrd*(NbCom).

3.3.2 Node B Support Capability-based Admission Control

Node B can carry E-DCH Resources Information→ Resource Operational State and HSDPA Capability in AUDIT RESPONSE message; if E-DCH Resources Information→ Resource Operational State is “Disabled” or E-DCH Capability is “E-DCH non Capable”, E-DCH admission control will reject the new service request for the cause “Node B Support Capability Limit (EDCH_NOT_AVAILABLE)”.

3.3.3 Uplink Interference-based Admission Control

For non GBR E-DCH traffic, Uplink Interference increment need not be calculated(increment is 0), but Admission judgment is needed. For DCH and GBR

E-DCH traffic, both Uplink Interference increasment calculation and Admission judgment are needed.

3.3.3.1 Effective load calculated

For Uplink Interference increment calculation and Uplink Interference-based Admission judgment, Uplink Effective load should be got which can not be controlled by NodeB..

Uplink Effective load =UL Base Noise + load from UL DCH + load from non scheduled E-DCH + load from GBR data rate of scheduled E-DCH.

NodeB can send E-DCH Resources Information-->Resource Operational State and HSDPA Capability IE in AUDIT RESPONSE message. If the value of E-DCH Resources Information-->Resource Operational State IE is "Disabled" or "E-DCH Capability" IE is "E-DCH non Capable", E-DCH will refuse to access any new E-DCH traffic, the cause is "NodeB Capabiliy Limited".

If a=10^((RSEPS)/10), Itotal=10^((RTWP*)/10) [mW],

Then Uplink Effective load = Itotal (1-a) + load from GBR data rate of scheduled E-DCH

In which:

I_{total} (1-a) means: base noise + load from UL DCH + load from non scheduled E-DCH , which can be got from common measurement report of RTWP* and RSEPS;

load from GBR data rate of scheduled E-DCH can be calculated by the formula:

$\Delta I(dBm) = I_{total} \cdot \frac{C_L}{1-\eta}$ (which comes from: $\Delta I(dBm) = (I_{total} - \Delta I) \cdot \frac{C_L}{1-\eta-C_L}$)

In which:

- I_{total} comes from NodeB common measurement report (RTWP*)
- $\eta = 1 - N_0 / I_{total}$
- N_0 refers to uplink background and receiver noise power, which originates from *OriBckNoise (BckNoiseAdjSwh* is set to "OFF"*)* or is obtained through

automatic uplink noise floor measurement (*BckNoiseAdjSwh* is set to "ON").,refers to 3.1.1.3 Automatic measurement of uplink noise floor

– Load estimate factor $C_L = (1 + UlInterFactor) \cdot \frac{1}{1 + \frac{W}{\beta \cdot R \cdot \alpha}}$, W=3.84e6 [bit/s].

– α refers to active factor (*Alfa*).

– UlInterFactor refers to the factor for uplink interference of adjacent cell on current cell.(the value is 0.5)

– β=10^((Eb/N0)/10), EbN0 refers to uplink service quality factor, with values listed in Table 3-1.

– β=10^((Eb/N0)/10), EbN0 refers to E-DCH service quality factor, with the value of 1dB,

– R refers to the total GBR data rate of scheduled E-DCH online.

3.3.3.2 Uplink Interference increment(ΔI) calculation for new E-DCH

For non GBR E-DCH traffic, Uplink Interference increment need not be calculated(increment is 0), but Admission judgment is needed. For DCH and GBR E-DCH traffic, both Uplink Interference increasment calculation and Admission judgment are needed. Uplink Interference increasment for new E-DCH can be calculated an following

$$\Delta I(dBm) = I_{total} \cdot \frac{C_L}{1 - \eta - C_L}$$

In which:

– I_{total} use the Effective load calculated se the rules in "3.3.3.1 Effective load calculated"

– $\eta = 1 - N_0 / I_{total}$

– N_0 refers to uplink background and receiver noise power, which originates from *OriBckNoise (BckNoiseAdjSwh* is set to "OFF"*)* or is obtained through automatic uplink noise floor measurement (*BckNoiseAdjSwh* is set to "ON").,refers to 3.1.1.3 Automatic measurement of uplink noise floor

– Load estimate factor $C_L = (1 + UlInterFactor) \cdot \frac{1}{1 + \frac{W}{\beta \cdot R \cdot \alpha}}$, W=3.84e6 [bit/s].

– α refers to active factor (*Alfa*).

– UlInterFactor refers to the factor for uplink interference of adjacent cell on current cell.(the value is 0.5)

– $\beta=10^{((Eb/N0)/10)}$, EbN0 refers to E-DCH service quality factor, the value of scheduled E-DCH is 1dB and the value of non scheduled E-DCH listed in Table 3-1.

– R refers to the target data rate which a service is admitted. (GBR is used for GBR E-DCH, Orginary I/B traffic need not calculate (increment is 0).

Notes: If more than one traffic are accessed to the cell or any traffic are deleted from the cell during one common measurement report period, the Uplink Interference increment from which should be taken into account in ΔI

3.3.3.3 Uplink Interference Access judgment

Scheduled E-DCH Access Judgment:

If ΔI + Uplink Effective load > *EdchAcThresh*, then the new traffic is refused to access the cell for the cause of Uplink Interference limited; else, Uplink Interference not limited and access allowed

Non Scheduled E-DCH Access Judgment:

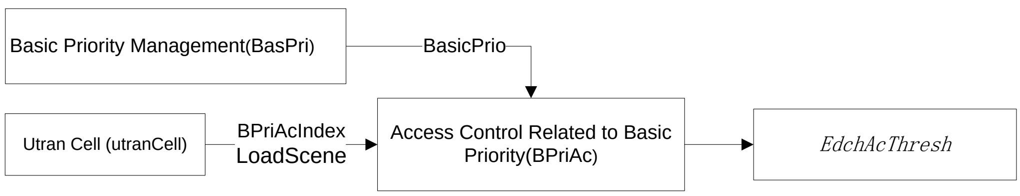
If ΔI + " load from UL DCH + load from non scheduled E-DCH" > *DchUlAcThresh* or "ΔI + Uplink Effective load" > *EdchAcThresh,* then the new DCH or non scheduled E-DCH traffic is refused to access the cell for the cause of Uplink Interference limited; else, Uplink Interference not limited and access allowed.

Concurrent services Access Judgment:

For new traffic added to a traffic online, only new traffic is need to judge whether Uplink Interference will be limited and the procedure is the same to a new traffic.

For Concurrent traffic added to a cell for the same time(i.e Concurrent services handover), Uplink Interference access judgment will be judged one traffic by one traffic. Concurrent traffic will be refused to access the cell for the cause of Uplink Interference limited if one traffic will be limited.

Figure 3-4 Configuration steps of E-DCH admission control threshold



3.3.4 CE Resource-based Admission Control

The CE resource-based admission control in HSUPA is similar to that in R99.

No service will be admitted in a cell in the case of insufficient Node B CE resources. Whether Node B CE resources are sufficient is judged based on the resource amount (Credit) and resource consumption amount (Cost) in IE"Local Cell Information" (IE"Local Cell Group Information" for cell group-based sharing of Node B resources) of Audit Response or Resource Status Indication.

- Credit report method: Judge whether CE resources are shared for uplink and downlink resources based on whether there is IE"UL Capacity Credit"IE in IE"Local Cell Information" (or IE"Local Cell Group Information" for cell group-based sharing of Node B resources) of Audit Response or Resource Status Indication.

- CE cost for Cell basic common channel is reserved by Node B. When CE admission control is decided in RNC, CE cost for Cell basic common channel is not considered; only Dedicated Channel and MBMS Channel need CE cost admission decide. CE cost value in IE "AUDIT RESPONSE" or "RESOURCE STATUS INDICATION" for common channel is only used for MBMS. CE cost accumulation is only for Dedicated Channel and MBMS Channel, CE cost for MBMS Channel is also added in Dedicated CE cost accumulation. For same carrier shared by multi-PLMN, CE cost for MBMS Channel is added to the Common PLMN. Notes: the basic common channel that Node B reserved CE includes: PSCH, SSCH, CPICH, P-CCPCH, PICH, MICH, AICH, E-AGCH, E-RGCH, E-HICH ,SCCPCH carrying PCH and FACH not used for MBMS(not including SCCPCH carrying MBMS channel)Usage of Cost: Judge whether the admission request RL is the first RL in the RLS; if not (that is, handover UE), only cost2 of RL needs to be taken into account; if so (that is, newly admitted UE), cost1 of RLS needs to be taken into account in addition to cost2. Values of Cost1 and Cost2 are related to SF. The correspondence between Cost1/Cost2 and SF originates from IE"Dedicated Channels Capacity Consumption Law" in IE"Local Cell Information" or IE"Local Cell Group Information", and indicates the amount of CE resources consumed by a dedicated channel relative to the SF. The SF equals max(the sum of E-DCH GBR multiplexed to the same MAC-d flow), in which, the GBR of conversational traffic equals the MBR, the GBR of streaming traffic equals the GBR of RAB Assignment Request; the GBR of I/B traffic equals the min(*EdchNormBitRate*,MBR)(Iub MAC-es Guaranteed Bit Rate for Iub parameters: the GBR of conversational traffic equals the MBR, the GBR of streaming traffic equals the GBR of RAB Assignment Request; the GBR of I/B traffic equals the min(*EdchNormBitRate*,MBR))

For HSUPA CE admission control, only uplink E-DCH resource consumption need to be considered; downlink E-AGCH and E-RGCH/E-HICH is reserved before capacity reported. The consumption rule is reported by Node B.

Different decision formulas are given as follows based on whether uplink and downlink CE resources are shared:

- Uplink and downlink adopt separate CE resources.

  Uplink E-DCH resource decision formula:

$$ULTotalCost + ULCost2 + ULCost1 \le UL\ Capacity\ Credit$$

- CE resources shared by uplink and downlink

$$ULTotalCost + DLTotalCost + ULCost2 + ULCost1 \le DL\ Or\ Global\ Capacity\ Credit$$

If the above formula is met, subsequent admission decision is made; otherwise, the admission request is directly rejected.

Where,

Whether the CE resource state in NodeB is available for new HSUPA traffic can be got by the following extension information element:

1. ptResourceIndMsg->local_Cell_Group_InfoList.elem[n].extElem1.numocts= 1

   ptResourceIndMsg->local_Cell_Group_InfoList.elem[n].extElem1.data[0] |= 1 /*if the first bit value is 1, the local_Cell_Groupcan not admit new HSUPA traffic; if the first bit value is 0, the local_Cell_Group can admit new HSUPA traffic */

2. ptAuditRespMsg->tLCell_Group_InfoList.elem[n].extElem1.numocts = 1

ptAuditRespMsg->tLCell_Group_InfoList.elem[n].extElem1.data[0] |= 1 /* if the first bit value is 1, the local_Cell_Groupcan not admit new HSUPA traffic; if the first bit value is 0, the local_Cell_Group can admit new HSUPA traffic */

UL Capacity Credit refers to total uplink CE resources reported by Node B.

DL Or Global Capacity Credit refers to total CE resources reported by Node B.

ULTotalCost refers to accumulated consumption of uplink resources.

DLTotalCost refers to accumulated consumption of downlink resources.

Cost1 refers to CE resources consumed by the radio link set relative to E-DCH.

Cost2 refers to CE resources consumed by the radio link relative to E-DCH.

CE resource admission decision for local cell group: If “RL currently set up” is the first link in the RLS, the consumed CE resources contain Cost1 and Cost2, which are calculated based on the consumption rule reported by Node B. If “RL currently set up” is not the first link in the RLS, the consumed CE resources only contain Cost2.

CE resource admission decision for local cells: The consumed CE resources of RL currently set up always contain Cost1 and Cost2.

3.3.5 UE Numbers-based Admission Control

Excessive UEs (Especially for low-rate I/B class services, which cannot be restricted in terms of power and throughput) carried on E-DCH in CELL_DCH state may result in low rate for all services and restrain E-DCH from taking full advantage of its high-rate feature. Therefore, the number of services carried on E-DCH in CELL_DCH state must be restricted. Operators can set the maximum number of UEs (*EdchTrafLimit*) that can be carried on E-DCH in CELL_DCH state. If the new service is accessed, the number of UEs carried on E-DCH in CELL_DCH state in current cell exceeds the parameter “*EdchTrafLimit*”, the new service is rejected for the cause “E-DCH User Limit”; otherwise it is admitted.

3.3.6 Downlink Channel Capacity-based Admission Control

A maximum of 20 UEs can be multiplexed on one E-HICH/E-RGCH. Therefore, the number of E-DCH UEs is also limited by the capacity of E-HICH/E-RGCH, which is 20 * Number of E-HICH/E-RGCH (*NumofErgHich*). If the new service is accessed, the number of UEs carried on E-DCH in CELL_DCH state in current cell exceeds 20 * Number of E-HICH/E-RGCH, the new UE is rejected on E-DCH for the cause “E-DCH Downlink Capacity Limit”; otherwise it is admitted.

3.3.7 UE RLC Capability-based Admission Control

During RB setup or reconfiguration, the configuration of UE RLC radio access capability parameter cannot exceed UE capability:

1. Maximum number of AM entities:

   Same as R99.

2. Maximum RLC AM Window Size

Same as R99. (Table 3-4 lists the correspondence between service rate and RLC window).

3. Total RLC AM and MAC-hs buffer size

Same as R99.

Note:

If both DCH and E-DCH are configured for uplink direction, and a service is concurrently set up on DCH and E-DCH, the rate of DCH is restricted to 64 kbps at most.

3.3.8 Processing upon Admission Rejection

For different services and different QoS levels, the requested service shall not be directly rejected as a result of cell resource insufficiency; instead,the system needs to perform forced disconnection, queuing and re-scheduling policies for the service based on its delay requirement and priority to improve connection rate. For details, see *ZTE UMTS Congestion Control Feature Guide*.

3.4 MBMS Admission Control

3.4.1 Related Measurement

3.4.1.1 Common measurement on Iub interface

- TCP

  Same as R99/HSDPA.

3.4.2 Principle of MBMS Admission Control

MBMS services include two modes: Broadcast and Multicast modes, or P-T-P and P-T-M modes. In broadcast mode, MBMS services can only be transmitted in P-T-M mode; in multicast mode, they can be transmitted in either P-T-P or P-T-M mode, depending on the number of activated UEs. In P-T-P mode, signaling adopts DCCH and services adopt

DTCH, and both DCCH and DTCH are mapped into DCH or FACH. In our strategy, both DCCH and DTCH are only mapped into DCH in P-T-P mode. In P-T-M mode, three new logical channels are adopted: MCCH, MTCH and MSCH. They are all mapped into FACH. Therefore, MBMS admission control algorithm contains: P-T-M-based FACH admission control and P-T-P-based DCH admission control.

1 Admission of MBMS services carried in P-T-P mode

MBMS admission control strategy is the same as R99 except that MBMS features must be taken into account regarding the limit to Node B support capability and the number of services (*MbmsTrafLimit*).

2 Admission of MBMS services carried in P-T-M mode

For Background services, SCCPCH is set up based on service requirements. An SCCPCH can carry several FACHs. When the resources of an SCCPCH are used up, a new SCCPCH is set up to admit a new Background service. For Streaming class services, SCCPCH is set up based on the one-to-one correspondence MTCH—FACH—SCCPCH. That is, to carry a Streaming-class service of 64K, set up a 64K SCCPCH; to carry a Streaming-class service of 256K, set up a 256K SCCPCH. In fact, an SCCPCH is used as a dedicated channel, and each SCCPCH only carries one Streaming-class service.

Therefore, before a new SCCPCH is set up, the admission control needs to make decisions based on Node B support capability, number of services, CE resources, downlink channelization codes and downlink throughput; otherwise, it only needs to make decisions based on Node B support capability, number of services and downlink throughput.

3.4.3 Node B Support Capability-based Admission Control

MBMS services support separate networking or hybrid networking with non-MBMS services. Cells can be classified into three types based on whether they support MBMS: MBMS cells, non-MBMS cells and hybrid MBMS cells.

Node B support capability-based admission control checks cell attributes and obtain whether IE”Resource Operational State” is “Enabled” or “Disabled” and whether

"Availability Status" is "Empty" or "Failed" in cell IE"MICH Information" through AUDIT RESPONSE. If IE"Resource Operational State" is "Disabled" and "Availability Status" is "Failed", or cell is not MBMS-capable, the new MBMS service is rejected for the cause "Node B Support Capability Limit"; otherwise, it is admitted.

3.4.4 UE Numbers-based Admission Control

To facilitate control and ensure system security for operators, you need to restrict the number of MBMS services carried in a specific cell. Operators can set the maximum number of MBMS services (*MbmsTrafLimit*) in a cell. If the number of MBMS UEs carried in current cell exceeds the parameter "*MbmsTrafLimit*", a new MBMS UE is rejected for the cause "MBMS User Limit"; otherwise it is admitted.

3.4.5 CE Resource-based Admission Control

Same as R99 except that SF of SCCPCH is adopted.

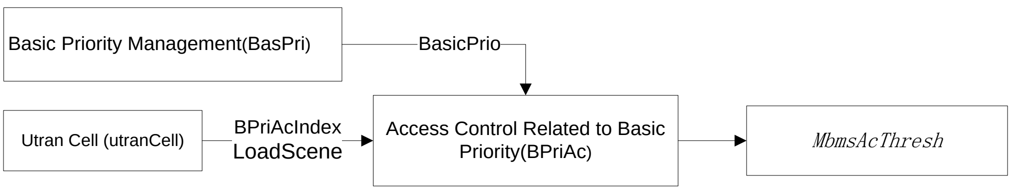
3.4.6 Downlink Channelization Code-based Admission Control

Same as R99.

3.4.7 Downlink Power-based Admission Control

Downlink power-based admission control is not performed for MBMS services in P-T-M mode; for MBMS services in P-T-P mode, the downlink power-based admission control is the same as R99 DCH and HS-DSCH admission control strategy except that the admission threshold is *MbmsAcThresh.* The admission threshold *MbmsAcThresh* is configured in the steps shown in the following figure.

Figure 3-5 Configuration steps of MBMS admission control threshold



3.4.8 Downlink Throughput-based Admission Control

For MBMS cells, MBMS services can use all bandwidth resources in current cell; for hybrid cells, the cell throughput resources occupied by MBMS services must be limited. Therefore, different throughput thresholds (*MbmsThrputThresh*) must be set for MBMS services for cells with different attributes, with decision procedure as follows:

1 Calculate the maximum throughput carried on SCCPCH in current cell: $CellMbmsTotalRate = \sum_{i=1}^{CurNum} \text{maximum FACH transmit data rate of } SCCPCH_i$; where, the maximum FACH transmit data rate of $SCCPCH_i$ = min (Rate relative to maximum TFCS of $SCCPCH_i$, rate relative to the SF of $SCCPCH_i$). After an SCCPCH link is deleted, you need to delete the bandwidth of the SCCPCH from CellMbmsTotalRate.

2 When a new MBMS requests SCCPCH resource allocation, the admission control makes decision based on the following formula: $CellMbmsTotalRate + \text{maximum FACH transmit data rate for the new Sccpch} > MbmsThrputThresh$ If the formula is met, the new UE is not admitted on SCCPCH for the cause "MBMS Throughput Limit"; otherwise, it is admitted.

3.4.9 Processing upon Admission Rejection

For different services and different QoS levels, the requested service shall not be directly rejected as a result of cell resource insufficiency; Instead, the system needs to perform forced disconnection, queuing and re-scheduling policies for the service based on its delay requirement and priority to improve connection rate. For details, see *ZTE UMTS Congestion Control Feature Guide*.

3.5 Admission Control when the Cells in Different PLMNs Share the CE resources

NodeB indicate to RNC whether the Different PLMNs Share the CE resources with ZTE private interface, the interface is following:

Different NodeB type is distinguished by ptAuditRespMsg->tLCell_Group_InfoList.elem[n].extElem1.

extElem1.numocts = 1or 0 indicates old type Node B; extElem1.numocts = 2 or larger indicates new type Node B.

Whether the Different PLMNs Share the CE resources Different NodeB type is distinguished by ptAuditRespMsg->tLCell_Group_InfoList.elem[n].data[1].

Value 0 of the first Bit of data[1] indicates CE not shared; Value 1 indicates CE shared.

The switch decision for CE sharing:

If extElem1.numocts = 1or 0:

- If CeShareSwitch =! 0 and CEShareMode＝0, CE share mode 0 for Shared Carriers of the Cells in Different PLMNs.
- If CeShareSwitch=! 0 and CEShareMode＝1, CE share mode 1 for Shared Carriers of the Cells in Different PLMNs.
- If CeShareSwitch= 0, and the CE credit in Local cell is less than the CE credit in Local cell group, and CEShareMode＝0, CE share mode 0 for Independent Carriers of the Cells in Different PLMNs.
- If CeShareSwitch=0, and the CE credit in Local cell is less than the CE credit in Local cell group, and CEShareMode＝1, CE share mode 1 for Independent Carriers of the Cells in Different PLMNs.
- If CeShareSwitch=0, and the CE credit in Local cell equals to the CE credit in Local cell group, CE not shared.

If extElem1.numocts = 2 or larger:

- If CeShareSwitch =! 0 and CEShareMode＝0, CE share mode 0 for Shared Carriers of the Cells in Different PLMNs.
- If CeShareSwitch=! 0 and CEShareMode＝1, CE share mode 1 for Shared Carriers of the Cells in Different PLMNs.
- If CeShareSwitch= 0, and the Value of the first Bit of data[1] is 1, and CEShareMode ＝0, CE share mode 0 for Independent Carriers of the Cells in Different PLMNs.

- If CeShareSwitch=0, and the Value of the first Bit of data[1] is 1, and CEShareMode ＝1, CE share mode 1 for Independent Carriers of the Cells in Different PLMNs.

For details about admission control when PLMNs do not share the CE resources, see section 3.1.2.1 "CE resource-based admission control", section 3.3.4 "CE resource-based admission control", and section 3.4.5 "CE resource-based admission control". The document mainly describes the admission control strategies when the independent carriers of PLMNs share the CE resources and when the shared carriers of PLMNs share the CE resources.

3.5.1 Admission Control when the Independent Carriers of the Cells in Different PLMNs Share the CE resources

3.5.1.1 Principles for Reporting the CE Credit when the Cells in Different PLMNs Share the CE resources

For the software version that allows different PLMNs to share the CE resources, both Audit Response and Resource Status Indication of NodeB contain two IEs (Local Cell Information and Local Cell Group Information). The CE Credit of the former indicates the minimum number of CE resources to be used in the cell group by the operator (PLMN), and the CE Credit of the latter indicates the maximum number of CE resources to be used in the cell group by the operator (PLMN).

3.5.1.2 CE-Based Admission Control Algorithm when the Cells in Different PLMNs Share the CE resources

When the NodeB CE resources are not enough, the corresponding service is not allowed to access the corresponding cell. The Credit and Cost values contained in Local Cell Information and Local Cell Group Information in Audit Response or Resource Status Indication determine whether the NodeB CE resources are enough.

For the software version that allows different PLMNs to share the CE resources, both of the following two conditions must be met for CE admission control:

- CE admission decision in the cell group: The number of occupied CE resources in the cell group does not exceed the total number of CE resources in the cell group.

- CE admission decision in a PLMN in the cell group: The number of occupied CE resources in a certain PLMN in the cell group does not exceed the number of available CE resources in the PLMN in the cell group.

If either condition is not met, CE admission fails. If both conditions are met, CE admission is successful.

For details about CE admission decision in the cell group, see section 3.1.2.1 “CE resource-based admission control”, section 3.3.4 “CE resource-based admission control”, and section 3.4.5 “CE resource-based admission control”. The following section describes the CE admission decision process in a certain PLMN in the cell group.

Notes:

(1) When the PLMN of UE changed, the CE cost in old PLMN will be released and CE admission control be decided in new PLMN. If the new PLMN is limited by CE, the UE will be denied to admit to the new PLMN.

(2) For S-RNC relocation, if PLMN changed and CE admission is successful in new PLMN, but reconfiguration is not successful for any other reason, the CE cost will be return to the old PLMN.

3.5.1.2.1 CE-Based DCH Admission Control in a Certain PLMN in the Cell Group

1 Check whether the Resource Operational State value contained in Cell Information in Audit Response or Resource Status Indication of the corresponding cell is Enabled. If the Resource Operational State value is Disabled, system resources are not available and thus the admission request is directly rejected.

   Check whether Audit Response or Resource Status Indication contains Local Cell Group Information. If not, the DCH admission decision is made (the CE resources in a certain PLMN in the cell group are not restricted).

2 Check Local Cell Group Information in Audit Response or Resource Status Indication contains the UL Capacity Credit IE. If yes, the uplink uses its independent CE resources, and the total quantity is UL Capacity Credit. If not, the uplink and downlink share the CE resources, and the total quantity is DL Or Global Capacity

Credit. If neither UL Capacity Credit nor DL Or Global Capacity Credit is available, the DCH admission decision is made (the CE resources in a certain PLMN in the cell group are not restricted).

3 Check whether the RL in the admission request is the first RL in the corresponding RLS. If not (switched user), you only need to consider the resource consumption cost2 of RL. If yes (new user), you also need to consider the resource consumption cost1 of the RLS. The resource consumption is derived from Dedicated Channels Capacity Consumption Law in Local Cell Information. Its value is determined by the spreading factor, that is, how the dedicated channel resources are consumed.

- Uplink and downlink adopt separate CE resources:

Decision of UL CE restriction:

$$ULTotalCost + N * UL\cos t2 + UL\cos t1 \leq$$

{ UL Capacity Credit reported in the cell group −

$$\sum_{\text{Cumulative sum of other PLMNs}} \max(\text{Number of CEs occupied by the uplink channels, UL Capacity Credit reported by the cell})$$

}

If the formula holds true, the subsequent admission decision is made. Otherwise, the admission request is directly rejected.

Decision of DL CE restriction:

$$DLTotalCost + N * DL\cos t2 + DL\cos t1 \leq$$

{DL or Global Capacity Credit reported in the cell group −

$$\sum_{\text{Cumulative sum of other PLMNs}} \text{Max (Number of CEs occupied by the downlink channels, DL or Global Capacity Credit reported by the cell)}$$

}

If the formula holds true, the subsequent admission decision is made. Otherwise, the admission request is directly rejected.

- CE resources shared by uplink and downlink:

$$ULTotalCost + DLTotalCost + N*ULcost2 + ULcost1 + N*DLcost2 + DLcost1 \leq$$

{DL or Global Capacity Credit reported in the cell group −

$$\sum_{\text{Cumulative sum of other PLMNs}} \text{Max (Number of CEs occupied by the uplink and downlink channels, DL or Global Capacity Credit reported by the cell)}$$

}

If the formula holds true, the subsequent admission decision is made. Otherwise, the admission request is directly rejected.

In the formula,

ULTotalCost refers to the accumulative CE resources consumed by the dedicated uplink in a certain PLMN in the cell group.

DLTotalCost refers to the accumulative CE resources consumed by the dedicated downlink in a certain PLMN in the cell group.

Cost1 refers to the CE resources consumed by the reported RLS in the cell.

Cost2 refers to the CE resources consumed by the reported RL in the cell.

N refers to the number of channelized codes.

3.5.1.2.2 CE-Based E-DCH Admission Control in a Certain PLMN in the Cell Group

1. Check whether Audit Response or Resource Status Indication contains Local Cell Group Information. If not, the DCH admission decision is made (the CE resources in a certain PLMN in the cell group are not restricted).

2. Check whether Local Cell Group Information in Audit Response or Resource Status Indication contains the UL Capacity Credit IE. If yes, the uplink uses its independent CE resources and the total quantity is UL Capacity Credit. If not, the uplink and downlink share the CE resources, and the total quantity is DL Or Global Capacity Credit. If neither UL Capacity Credit nor DL Or Global Capacity Credit is available, the DCH admission decision is made (the CE resources in a certain PLMN in the cell group are not restricted).

3 Check whether the RL in the admission request is the first RL in the corresponding RLS. If not (switched user), you only need to consider the resource consumption cost2 of RL. If yes (new user), you also need to consider the resource consumption cost1 of the RLS. The resource consumption is derived from E-DCH Capacity Consumption Law in Local Cell Information. Its value is determined by the spreading factor, that is, how the E-DCH channel resources are consumed.

Judge whether the following formulas hold true:

For CE admission of the HSUPA, you need to consider the resource consumption of both uplink E-DCH and downlink E-AGCH and E-RGCH/E-HICH. The consumption law is reported by NodeB.

- Uplink and downlink adopt separate CE resources:

The resource decision formula for the uplink E-DCH is as follows:

$$ULTotalCost + UL\cos t2 + UL\cos t1 \le$$

{UL Capacity Credit reported in the cell group −

$$\sum_{\substack{\text{Cumulative sum} \\ \text{of other PLMNs}}} \max(\text{Number of CEs occupied by the uplink channels, UL Capacity Credit reported by the cell})$$

}

- CE resources shared by uplink and downlink:

$$ULTotalCost + DLTotalCost + UL\cos t2 + UL\cos t1 \le$$

{DL or Global Capacity Credit reported in the cell group −

$$\sum_{\substack{\text{Cumulative sum} \\ \text{of other PLMNs}}} \text{Max (Number of CEs occupied by the uplink and downlink channels, DL or Global Capacity Credit reported by the cell)}$$

}

If the formula holds true, the subsequent admission decision is made. Otherwise, the admission request is directly rejected.

In the preceding formulas:

ULTotalCost refers to the accumulative CE resources consumed by the dedicated uplink in a certain PLMN in the cell group.

DLTotalCost refers to the accumulative CE resources consumed by the dedicated downlink in a certain PLMN in the cell group.

cost1 refers to the CE resources consumed by the radio link set corresponding to the reported E-DCH in the cell.

Cost2 refers to the CE resources consumed by the radio link corresponding to the reported E-DCH in the cell.

3.5.1.2.3 CE-Based MBMS Admission Control in a Certain PLMN in the Cell Group

1 The resource consumption DLcost is extracted from Common Channels Capacity Consumption Law contained in Local Cell Information. The DLcost value is determined by the SF of the SCCPCH, that is, how the SCCPCH physical channels are consumed.

2 Judge whether the following formulas hold true:

- Uplink and downlink adopt separate CE resources:

{DL or Global Capacity Credit reported in the cell group −

$$\sum_{\text{Cumulative sum of other PLMNs}} \text{Max (Number of CEs occupied by the downlink channels, DL or Global Capacity Credit reported by the cell)}\ \}$$

$$-N*DL\cos t\ -DLTotal\cos t \geq 0$$

- CE resources shared by uplink and downlink:

{DL or Global Capacity Credit reported in the cell group −

$$\sum_{\text{Cumulative sum of other PLMNs}} \text{Max (Number of CEs occupied by the uplink and downlink channels, DL or Global Capacity Credit reported by the cell)}\ \}$$

$$-N*DL\cos t-ULTotal\cos t-DLTotal\cos t\geq 0$$

In the formulas:

N refers to the number of channelized codes. ULTotalCost refers to the accumulative CE resources consumed by the uplink in a certain PLMN in the cell group. DLTotalCost refers to the accumulative CE resources consumed by the downlink in a certain PLMN in the cell group.

If the formula holds true, the subsequent admission decision is made. Otherwise, the admission request is directly rejected.

3.5.2 Admission Control when the Shared Carriers of the Cells in Different PLMNs Share the CE resources

3.5.2.1 Principles for Reporting the CE Credit and for Configuring the Operator's Available CE Proportion when CE resources are Shared

In the scenario where the shared carriers share the CE resources, NodeB cannot see the PLMN information. Therefore, the total CE Credit in the resource pool is reported in Cell Local Group. The RNC is configured with the minimum available CE proportion of the Node Background carrier (PLMN), indicating the minimum proportion of available CE resources in each Cell Local Group. The maximum number of PLMNs sharing one RAN that RNC can support is no more than four. Parameters in the following are configured:

Parameter Name	Parameter Description	Value Range	Default Value	Notes
PLMNNum	Number of PLMN for RAN Sharing	Enum [0, 2, 3,4]	0	0 indicates it doesn't support the function of shared carriers of PLMNs share the CE resources
MCCRANSharing [4]	MCC for RAN Sharing	0..999	No	No
MNC4RANSharing [4]	MNC for RAN Sharing	0..999	No	No

MinCEPercent[4]	Minimal percent of CE can be used by the PLMN	(0…100)%,,step by 0.1%	No	The total of MinCEPercent [4] is no more than 100%

MinCEPercent[4] refers to the proportion of exclusive CE resources of each operator. Such exclusive CE resources are reserved for the operator, but cannot be used by other operators. The non-exclusive residual CE resources are shared by multiple operators.

3.5.2.2 How to Obtain the Available CE in a Certain PLMN in the Cell Group

Obtain the number of available CE resources in a certain PLMN in the cell group as follows:

If Audit Response or Resource Status Indication contains the Local Cell Group Information, check whether the Local Cell Group Information contains the UL Capacity Credit IE.

If yes, the uplink uses its independent CE resources and the total quantity is UL Capacity Credit, the downlink uses its own independent CE resources, and the total quantity is DL Or Global Capacity Credit.

Total number of available uplink CE resources in a certain PLMN in the cell group = (Total number of uplink CE resources in the cell group) –

$$\sum_{\substack{\text{Cumulative sum of}\\ \text{related quantities of other}\\ \text{PLMNs in the cell}}} \text{Max (Number of CEs occupied by the dedicated uplink channels, Total number of uplink CEs)}$$

Total number of available downlink CE resources in a certain PLMN in the cell group = (Total number of downlink CE resources in the cell group) –

$$\sum_{\substack{\text{Cumulative sum of}\\ \text{related quantities of other}\\ \text{PLMNs in the cell}}} \text{Max (Number of CEs occupied by the dedicated downlink channels, Total number of downlink CEs)}$$

If not, the uplink and downlink share the CE resources, and the total quantity is DL Or Global Capacity Credit.

Total number of available downlink and uplink CE resources in a certain PLMN in the cell group = (Total number of downlink and uplink CE resources in the cell group) –

$$\sum_{\substack{\text{Cumulative sum of}\\ \text{related quantities of other}\\ \text{PLMNs in the cell}}} \text{Max (Number of CEs occupied by the dedicated uplink and downlink channels, Total number of uplink and downlink CEs)}$$

If neither UL Capacity Credit nor DL Or Global Capacity Credit is available, the DCH admission decision is made (the CE resources in a certain PLMN in the cell group are not restricted).

3.5.2.3 CE-Based Admission Control Algorithm when the Cells in Different PLMNs Share the CE resources

When the NodeB CE resources are not enough, the corresponding service is not allowed to access the corresponding cell. The Credit and Cost values contained in "Local Cell Information" and "Local Cell Group Information" in Audit Response or Resource Status Indication determine whether the NodeB CE resources are enough.

For the software version that allows different PLMNs to share the CE resources, all of the following three conditions must be met for CE admission control:

- CE admission decision in the cell group: The number of occupied CE resources in the cell group does not exceed the total number of CE resources in the cell group.
- Cell admission: The number of occupied CE resources in the cell does not exceed the total number of CE resources in the cell.
- CE admission decision in a PLMAN in the cell group: The number of occupied CE resources in a certain PLMN in the cell group does not exceed the number of available CE resources in the PLMN in the cell group.

If either condition is not met, CE admission fails. If both conditions are met, CE admission is successful.

The procedure for CE admission decision in the cell group and CE admission decision in the cell the same as the procedure for CE admission decision in an existing cell group and CE admission decision in an existing cell. For details, see section 3.1.2.1 “CE-Based Admission Control”, section 3.3.4 “CE-Based Admission Decision”, and section 3.4.5 “CE-Based Restriction Decision”. The following section describes the CE admission decision process in a certain PLMN in the cell group.

Notes:

(1) When the PLMN of UE changed, the CE cost in old PLMN will be released and CE admission control be decided in new PLMN. If the new PLMN is limited by CE, the UE will be denied to admit to the new PLMN.

(2) For S-RNC relocation, if PLMN changed and CE admission is successful in new PLMN, but reconfiguration is not successful for any other reason, the CE cost will be return to the old PLMN.

3.5.2.3.1 CE-Based DCH Admission Control in a Certain PLMN in the Cell Group

Check whether the Resource Operational State value contained in Local Cell Information in Audit Response or Resource Status Indication of the corresponding cell is Enabled. If the Resource Operational State value is Disabled, system resources are not available and thus the admission request is directly rejected.

- Uplink and downlink adopt separate CE resources:

Decision of UL CE restriction:

$ULTotalCost + N * UL\cos t2 + UL\cos t1 \leq$ Total number of available uplink CE resources in the PLMN in the cell group

If the formula holds true, the subsequent admission decision is made. Otherwise, the admission request is directly rejected.

Decision of DL CE restriction:

$DLTotalCost + N * DL\cos t2 + DL\cos t1 \leq$ Total number of available downlink CE resources in the PLMN in the cell group

If the formula holds true, the subsequent admission decision is made. Otherwise, the admission request is directly rejected.

- CE resources shared by uplink and downlink:

Decision of UL CE restriction:

$\mathrm{ULTotalCost} + DLTotalCost + N * UL\cos t2 + UL\cos t1 + N * DL\cos t2 + DL\cos t1 \leq$ Total number of available uplink and downlink CE resources in the PLMN in the cell group

If the formula holds true, the subsequent admission decision is made. Otherwise, the admission request is directly rejected.

In the formula,

The total number of uplink CE resources in the PLMN in the cell group and the total number of uplink and downlink CE resources in the PLMN in the cell group can be obtained as described in section 3.5.2.2 "How to Obtain the Available CE resources in a Certain PLMN in the Cell Group".

ULTotalCost refers to the accumulative CE resources consumed by the uplink in a certain PLMN in the cell group.

DLTotalCost refers to the accumulative CE resources consumed by the downlink in a certain PLMN in the NodeB group.

Cost1 refers to the CE resources consumed by the reported RLS in the cell.

Cost2 refers to the CE resources consumed by the reported RL in the cell.

N refers to the number of channelized codes.

If the currently established RL is the first link in the corresponding radio link set, the consumed CE resources include Cost1 and Cost2 and are calculated according to the consumption law reported by NodeB. If the currently established RL is not the first link (switched user) in the corresponding RLS, the consumed CE resources only include Cost2. The resource consumption is derived from Dedicated Channels Capacity Consumption Law in Local Cell Information. Its value is determined by the spreading factor, that is, how the dedicated channel resources are consumed.

3.5.2.3.2 CE-Based E-DCH Admission Control in a Certain PLMN in the Cell Group

Check whether the Resource Operational State value contained in Local Cell Information in Audit Response or Resource Status Indication of the corresponding cell is Enabled. If the Resource Operational State value is Disabled, system resources are not available and thus the admission request is directly rejected.

For CE admission of the HSUPA, you need to consider the resource consumption of both uplink E-DCH and downlink E-AGCH and E-RGCH/E-HICH. The consumption law is reported by NodeB.

- Uplink and downlink adopt separate CE resources:

The resource decision formula for the uplink E-DCH is as follows:

$ULTotalCost + UL\cos t2 + UL\cos t1 \leq$ Total number of available uplink CE resources in the PLMN in the cell group

- CE resources shared by uplink and downlink:

$ULTotalCost + DLTotalCost + UL\cos t2 + UL\cos t1 \leq$ Total number of available uplink and downlink CE resources in the PLMN in the cell group

If the formula holds true, the subsequent admission decision is made. Otherwise, the admission request is directly rejected.

In the preceding formulas:

The total number of uplink CE resources in the PLMN in the cell group and the total number of uplink and downlink CE resources in a certain PLMN in the cell group can be obtained as described in section 3.5.2.2 “How to Obtain the Available CE resources in a Certain PLMN in the Cell Group”.

ULTotalCost refers to the accumulative CE resources consumed by the uplink in a certain PLMN in the cell group.

DLTotalCost refers to the accumulative CE resources consumed by the downlink in a certain PLMN in the cell group.

Cost1 refers to the CE resources consumed by the radio link set corresponding to the E-DCH reported in the cell.

Cost2 refers to the CE resources consumed by the radio link corresponding to the reported E-DCH in the cell.

3.5.2.3.3 CE-Based MBMS Admission Control in a Certain PLMN in the Cell Group

1 The resource consumption DLcost is extracted from Common Channels Capacity Consumption Law contained in Local Cell Information. The DLcost value is determined by the SF of the SCCPCH, that is, how the SCCPCH physical channels are consumed.

2 Judge whether the following formulas hold true:

- Uplink and downlink adopt separate CE resources:

Total number of available downlink CE resources in the Common PLMN in the cell group $-N*DL\cos t-DLTotal\cos t\geq 0$

- CE resources shared by uplink and downlink:

Total number of available uplink and downlink CE resources in the Common PLMN in the cell group $-N*DL\cos t-ULTotal\cos t-DLTotal\cos t\geq 0$

In the formula:

N refers to the number of channelized codes. ULTotalCost refers to the accumulative CE resources consumed by the uplink in the Common PLMN in the cell group. DLTotalCost refers to the accumulative CE resources consumed by the downlink in the Common PLMN in the cell group. The total number of downlink CE resources in the Common PLMN in the cell group and the total number of uplink and downlink CE resources in the Common PLMN in the cell group can be obtained as described in section 3.5.2.2 "How to Obtain the Available CE resources in a Certain PLMN in the Cell Group".

If the formula holds true, the subsequent admission decision is made. Otherwise, the admission request is directly rejected.

3.6 Admission Control for Dual-Cell HSDPA

If the Dual-Cell HSDPA is introduced, only the admission strategies related to HSDPA load are affected, that is, admission control based on the number of users, data throughput, and downlink power. If a cell supports both the Dual-Cell HSDPA and R99 services, the impact upon the DCH admission algorithm need to be considered.

The Dual-Cell HSDPA admission control complies with the following principle: If the admission request of a certain factor of a carrier is rejected, the carrier is not considered in the next factor decision. It is recommended that the number of users should be admitted first because the number of users is a hard resource.

3.6.1 Admission control based on the number of users

When Dual-Cell HS-DSCH channel is allocated to the UE, the admission decision about the number of HS-DSCH users needs to be made in both the primary carrier and the secondary carrier. The admission request is rejected so long as one of the carriers rejectes. When a Dual-Cell HS-DSCH user accesses a Dual-Cell HS-DSCH, the number of users is increased by 1 for both carriers that carry the UE.

3.6.2 Admission control based on the data throughput

After the Dual-Cell HS-DSCH function is introduced, the throughput load of the HS-DSCH is still based on the GBR of the service.

1 Throughput statistics of the HS-DSCH service

When calculating the throughput of the HS-DSCH service, the system measures the throughput of the HS-DSCH service carried by a single carrier sector and the throughput of the HS-DSCH service carried by a Dual-Cell cell respectively.

The throughput load of the HS-DSCH service carrier over a single carrier sector is TotalRate.

The throughput load of the HS-DSCH service carrier over a Dual-Cell cell is TotalRate_dual.

2 Throughput threshold calculation of the HS-DSCH service

For a Dual-Cell HS-DSCH cell, the data throughput carried by the HS-DSCH of each carrier is calculated respectively:

The data throughput threshold of the HS-DSCH is calculated on the basis of a single carrier sector:

Threshold of data throughput carried by the HS-DSCH = *HspdschBitRate* (data transmission rate of one HS-PDSCH channel) ×Number of available HS-PDSCH channels for the cell

3 Throughput admission decision of the Dual-Cell HS-DSCH service

When the HS-DSCH service is accessed in a Dual-Cell HS-DSCH cell, the throughput admission decision is made in two circumstances:

- When the throughput of the UE that carries the Dual-Cell HS-DSCH is carried by two carriers: 1) If (sum of TotalRate for two carrier sectors) + (TotalRate_dual) + (GBR of the new service) is greater than the sum of the data throughput threshold carried by the HS-DSCHs of two carrier sectors, the admission request of the new service is rejected on the HS-DSCH. The reason is that the HS throughput is limited (HS_TRAFFICVOL_LIMIT) and the system triggers the data throughput congestion operation of two cells (Dual-Cell cells). If multiple cells are attempted but the admission requests are all rejected, the system only triggers the congestion operation of the first attempted cell. 2) Otherwise, the throughput admission request is accepted.

- When the throughput of the UE that carries the single-carrier HS-DSCH is carried by a certain carrier that supports the Dual-Cell HS-DSCH service: 1) If (TotalRate of the target carrier sector) + (GBR of the new service) is greater than the threshold of the data throughput carried by the HS-DSCH of the target carrier sector or if (TotalRate of the target carrier sector) + (TotalRate of the carrier sector that composes a Dual-Cell HS-DSCH cell together with the target carrier sector) + (TotalRate_dual) + (GBR of the new service) is greater than (threshold of data throughput carried by the HS-DSCH of the target carrier sector) + (threshold of data throughput carried by the HS-DSCH of the carrier sector that composes a Dual-Cell HS-DSCH cell together with the target carrier sector), the admission request of the new service is rejected on the HS-DSCH. The reason is that the HS throughput is limited (HS_TRAFFICVOL_LIMIT) and the system triggers the data throughput congestion operation of the primary-carrier cell. 2) Otherwise, the throughput admission request is accepted.

3.6.3 Admission control based on the downlink power

The HS-DSCH admission control based on the downlink power is different from the DCH admission control as follows:

1 After the Dual-Cell HS-DSCH function is introduced, the downlink power admission threshold of the HS-DSCH of the Dual-Cell HS-DSCH cell is calculated respectively for each single carrier sector:

Pthreshold = MAXDlTxPwr * HsdpaAcThresh_first

In the formula:

MAXDlTxPwr refers to the maximum transmit power of the cell.

HsdpaAcThresh refers to the downlink power admission threshold of the HSDPA (unit: %).

2 Forecast of the power increment ΔP[mW] (the following calculation is only applicable to the service with guaranteed rate. For the I/B services, the value of 0 is directly assigned to ΔP):

Keep the original strategy.

3 Admission control based on the HS-DSCH downlink power

i If the HSDPA power is allocated by the RNC (*HsdschTotPwrMeth*) and the HS-DSCH service is accessed in the Dual-Cell HS-DSCH cell:

It is recommended that the implementation should be simplified and the power admission decision should not be made because the configuration is currently used for a debugging purpose. The configuration is not used in a commercially used network.

ii If the HSDPA power is allocated by NodeB (*HsdschTotPwrMeth*) freely and the HS-DSCH service is accessed in the Dual-Cell HS-DSCH cell:

- When the HS-DSCH is carried by dual carriers:

If the following formula holds true,

$$\Delta P + \text{Sum of NOHSDSCHPower of dual carrier sectors} +$$

$$\text{Sum of} \sum_{Spi-0}^{MaxSpi} \text{HSDSCHRequiredPower}_{Spi} \text{ of the dual carrier sectors} >$$

$$\text{Sum of Pthreshold of the dual carrier sectors}$$

the admission request of the HS-DSCH downlink power is rejected and power congestion of the primary and secondary carriers is triggered. Otherwise, the admission decision of the HS-DSCH downlink power is made.

- When the HS-DSCH is carried by a single carrier:

If the cell that composes a Dual-Cell HS-DSCH cell pair together with the target carrier sector meets the following conditions:

$$\Delta P + \text{Sum of NOHSDSCHPower of dual carrier sectors} +$$

$$\text{Sum of} \sum_{\text{Spi-0}}^{\text{MaxSpi}} \text{HSDSCHRequiredPower}_{\text{Spi}} \text{ of the dual carrier sectors}$$

$$> \text{Sum of Pthreshold of the dual carrier sectors}$$

or

$$\Delta P + \text{NOHSDSCHPower of the target carrier sector} +$$

$$\sum_{\text{Spi-0}}^{\text{MaxSpi}} \text{Non-DCUE HSDSCHRequiredPower}_{\text{Spi}} \text{ of the target carrier sector} > \text{Pthreshold}$$

The admission request of the HS-DSCH downlink power is rejected and power congestion of the primary carrier is triggered. Otherwise, the admission decision of the HS-DSCH downlink power is made.

If multiple GBR services initiate the admission request concurrently within one TCP measurement reporting period, the accumulative ΔP of these services is used as the total ΔP.

3.6.4 Impact upon DCH admission control

After the Dual-Cell HS-DSCH function is introduced, the DCH admission decision strategy for the Dual-Cell HS-DSCH cell is as follows:

1. If there exists no HS user, the admission decision formula is the same as the original R99 algorithm. The admission threshold is also the same as that of the original R99 algorithm.

2. If there exists a HS-DSCH user in the HSDPA cell, there are two formulas for the admission decision of DCH:

- If the admission threshold of the HS is higher than that of the R99 algorithm:

If the target carrier conforms to the following formula:

$\text{NOHSDSCHPower} + \Delta\text{P} <= \mathit{MaxDlTxPwr*DchDlAcThresh}$, and the target carrier conforms to the following carrier:

$$\text{NOHSDSCHPower} + \Delta\text{P} + \max(\sum_{\text{Spi}=0}^{\text{MaxSpi}} \text{Non-DC HSDSCHRequiredPower}_{\text{Spi}}, \mathit{MinHsdpaTotalPower}) <= \mathit{MaxDlTxPwr*HspdaAcThreshold}$$

and the cell that composes a Dual-Cell HS-DSCH cell pair together with the target carrier sector conforms to the formula,

$$\text{Sum of NOHSDSCHPower of dual carrier sectors} + \text{Sum of } \max(\sum_{\text{Spi-0}}^{\text{MaxSpi}} \text{HSDSCHRequiredPower}_{\text{Spi}}, \mathit{MinHsdpaTotalPower}) \text{ of the dual carrier sectors} + \Delta\text{P} <= \text{Sum of } \mathit{MaxDlTxPwr* HspdaAcThreshold} \text{ of the dual carrier sectors}$$

the admission request is accepted. Otherwise, the admission request is rejected and the system triggers the power congestion of the target carrier.

- If the admission threshold of the R99 algorithm is higher than that of the HS, the admission decision formula of the DCH is as follows:

If the target carrier conforms to the following formula:

$\text{NOHSDSCHPower} + \Delta\text{P} <= \mathit{MaxDlTxPwr*DchDlAcThresh}$, the target carrier conforms to the following carrier:

$$\text{NOHSDSCHPower} + \Delta\text{P} + \max(\sum_{\text{Spi}=0}^{\text{MaxSpi}} \text{Non-DC HSDSCHRequiredPower}_{\text{Spi}}, \mathit{MinHsdpaTotalPower}) <= \mathit{MaxDlTxPwr*}(\mathit{NodeBSafeThr} - \mathit{SafePowerOffset})$$

and the cell that composes a Dual-Cell HS-DSCH cell pair together with the target carrier sector conforms to the formula,

$$\text{Sum of NOHSDSCHPower of dual carrier sectors} +$$

$$\text{Sum of max}(\sum_{Spi-0}^{MaxSpi} \text{HSDSCHRequiredPower}_{Spi},$$

$$\textit{MinHsdpaTotalPower}) \text{ of the dual carrier sectors} + \Delta P$$

$$<=$$

$$\text{Sum of } \textit{MaxDlTxPwr* (NodeBSafeThr–SafePowerOffset)} \text{ of the dual carrier sectors}$$

the admission request is accepted. Otherwise, the admission request is rejected and the system triggers the power congestion of the target carrier.

In the formulas:

NodeBSafeThr comes from the database configuration Safety Threshold (*NodeBSafeThr*) When NodeB Uses the HSDPA Power Freely.

SafePowerOffset comes from the database configuration Offset of NodeB Safety Admission Threshold (*SafePwrOfst*) when the DCH Admission Priority of the HS Cell is Higher the Priority of the HS.

ΔP refers to the power increment forecast of the DCH.

3.7 DOWNLINK ENHANCED CELL_FACH admission control

For DOWNLINK ENHANCED CELL_FACH is carried on HS-DSCH in downlink, the admission control strategy for DOWNLINK ENHANCED CELL_FACH is similarly with HS-DSCH admission control strategy. For no associated-DPCH is existed in DOWNLINK ENHANCED CELL_FACH, channel code admission control is not needed. For DOWNLINK ENHANCED CELL_FACH is mainly used to carry signaling and I/B traffic, power-based admission control and data throughput-based admission control is not needed. Thus, only user number-based admission control is needed for or DOWNLINK ENHANCED CELL_FACH (Because the reserved Iub bandwidth etc is limited, the user number in DOWNLINK ENHANCED CELL_FACH cannot be infinity, or the Qos of users online in DOWNLINK ENHANCED CELL_FACH will decrease).

3.7.1 User number-based admission control for DOWNLINK ENHANCED CELL_FACH

When new traffic or signaling requests to carry on HS-DSCH in CELL_FACH state, if one of the following rules is met, User number for DOWNLINK ENHANCED CELL_FACH will limit the request and the reason is User number for DOWNLINK ENHANCED CELL_FACH limited; else, the request is admitted for User number-based admission control for DOWNLINK ENHANCED CELL_FACH.

1. The user number carried on HS-DSCH(singling only is not included) in CELL_FACH state is already larger than or equal to *DLEFACHUserNum*.

2. The user number carried on HS-DSCH(singling only is included) in CELL_FACH state is already larger than or equal to the number of dedicated H-RNTI for CELL_FACH state.(the number of dedicated H-RNTI for CELL_FACH state is fixed to128)

3.8 UPLINK ENHANCED CELL_FACH admission control

3.8.1 User number-based admission control for UPLINK ENHANCED CELL_FACH

When common E-RNTI is requested, if one of the following rules is met, User number for common E-DCH will limit the request and the reason is User number for common E-DCH limited; else, the request is admitted for User number for common E-DCH;.

1. The user number carried on E-DCH(singling only is not included) in CELL_FACH state is already larger than or equal to *CEdchUserNum*.

2. The user number carried on E-DCH(singling only is included) in CELL_FACH state is already larger than or equal to the number of common E-RNTI.(the number and common E-RNTI list is sent from Node B).

3.8.2 UPLINK ENHANCED CELL_FACH impaction for CE admission control

UPLINK ENHANCED CELL_FACH impaction for CE admission control is only the following points. Besides, all the other strategy(for example: CE for basic common channel reserved by Node B) is not changed:

1. Only Dedicated Channel and MBMS Channel need CE cost admission decide in
2. For CE admission control in CELL_DCH state, the latest CE credit reported from NodeB in IE “AUDIT RESPONSE” will be used. The CE for Common E-DCH is deduct from CE credit by NodeB before report to RNC in IE “AUDIT RESPONSE”.
3. NodeB should also report CE Credit in IE “RESOURCE STATUS INDICATION”. The report scene includes cell setup and CE credit changed.
4. When RNC calculate the CE use rate, denominator uses the latest CE credit in IE “RESOURCE STATUS INDICATION”, the numerator uses the CE sum of dedicated CE cost and Common E-DCH cost. The CE cost by Common E-DCH can be got by the difference between the CE credit in IE “AUDIT RESPONSE” and IE “RESOURCE STATUS INDICATION”
5. f CE credit in IE “RESOURCE STATUS INDICATION” is not received, the CE credit in IE “AUDIT RESPONSE”will be used as denominator for calculating the CE use rate. To avoid the CE Credit change not reported to RNC immediately, the CE Credit deduct Common E-DCH is used for calculating the CE use rate when CE Credit is less than the credit deduct Common E-DCH.

3.9 RNC Response for CE admission rejection in NodeB

3.9.1 RNC Response for CE admission rejection in NodeB

Receiving RADIO LINK SETUP FAILURE or RADIO LINK RECONFIGURATION FAILURE with the cause “Radio Resource not enough” and the indication the SF without available CE(by the ZTE private interface), this Failure will be treat the same as the CE CAC rejection in RNC: other channel type in CELL_DCH state will be re-selected and re-admitted. If re-admitted failed or on other channel type in CELL_DCH state, the CAC will be failed and congestion control strategy will be triggered.

Notes: For only one channel type can be selected in CELL_DCH state (no chance for the call to re-admit), the congestion control strategy may not be triggered and the call will be released simply when the Failure received.

3.9.2 CE Re-CAC Strategy for CE admission rejection in NodeB

Receiving RADIO LINK SETUP FAILURE or RADIO LINK RECONFIGURATION FAILURE with the cause “Radio Resource not enough”, NodeB will indicate the SF without available CE by the ZTE private interface to RNC.

While Re-CAC for CE admission rejection in NodeB, if no CE is available for the SF that the target Channel needed，the Re-CAC will be failed; Else, the ordinary CAC procedure will go on.

对于 NodeB 的 CE 接纳拒绝触发的二次接纳尝试，如果待尝试的信道配置所需消耗的 SF 没有可用 CE 资源，则直接 CE 接纳拒绝；否则，再走正常的 CE 接纳判决流程以及其它资源的接纳控制判决。

4 Related Parameters of Admission Control

4.1 Related Parameters of R99 Admission Control

4.1.1 List of Parameters

Abbreviated name	Parameter name
UlCacSwitch	Cell Uplink Admission Control Switch
DlCacSwitch	Cell Downlink Admission Control Switch
DchDlAcThresh	DCH Downlink Ac Threshold
DchUlAcThresh	DCH Uplink Ac Threshold

MAXDlTxPwr	Cell Maximum Transmission Power(dBm)
CodeTreeResRto	Code Tree Reserved Ratio
CellScen	Pathloss Scenario
RefSFLayer	Reference SF Layer Used for Code Reservation in CAC
BckNoiseAdjSwh	Background Noise Adjust Switch
OriBckNoise	Original Background Noise
BPriAcIndex(utranCell)	Basic Priority AC Index
BasicPrio	Basic Priority Used in Admission Control
CpichEcN0	Default CPICH Ec/No
MeasPrio	Measurement Priority of Neighboring Cell
MinDlDpchPwr	DPCH Minimum DL Power
TimeDelay	Transport Time Delay
PcpichPwr	P-CPICH Power
PathLoss	Nominal Pathloss
RrcSigUsrNumThr	Threshold of the Number of the RRC Signaling Users Co-Exist in the Cell
AmrRncAdjust	AMR Rate Adjustment Switch for RNC
AmrDnRateAcSwch	Switch of AMR Traffic Re-admission after AMR Rate Decrease
BpriAcIndex(BPriAc)	Basic Priority AC Index
RptPrd(NbCom)	Report Period
RptPrdUnit(NbCom)	Choice Report Periodicity Scale
BgNoiScene	Background Noise Automatic Adjustment Scene
LoadScene	Cell Load Scene

4.1.2 Parameter Configuration

4.1.2.1 Cell Uplink Admission Control Switch

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Modify Advanced Parameter->utranCell->Cell Uplink Admission Control Switch

- Parameter Configuration

  This parameter indicates whether the uplink admission control switch is set to "ON".

  If the switch is set to "ON", the system will make uplink interference-based admission decision.

  If the switch is set to "OFF", the new UE is directly admitted without making uplink interference-based admission decision.

4.1.2.2 Cell Downlink Admission Control Switch

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->Utran Cell->Utran Cell XXX->Modify Advanced Parameter->Utran Cell->Cell Downlink Admission Control Switch

- Parameter Configuration

  This parameter indicates whether the downlink admission control switch is set to "ON".

  If the switch is set to "ON", the system will make downlink interference-based admission decision.

  If the switch is set to "OFF", the new UE is directly admitted without making downlink interference-based admission decision.

4.1.2.3 DCH Downlink Ac Threshold

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->QOS Relevation Configuration->QOS Configuration->Access Control Related to Basic Priority->DCH Downlink AC Threshold

- Parameter Configuration

This parameter defines the downlink power admission threshold of the service carried over DCH. The admission control estimates downlink power of the DCH service initiating an admission request. If the total power exceeds the sub-threshold, the request is rejected; otherwise, it is admitted. Each basic priority is configured with an admission threshold.

More services can be admitted on DCH by increasing the value of this parameter,

Less services can be admitted on DCH by decreasing the value of this parameter.

4.1.2.4 DCH Uplink Ac Threshold

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->QOS Relevation Configuration->QOS Configuration->Access Control Related to Basic Priority->DCH Uplink AC Threshold

- Parameter Configuration

  This parameter defines the uplink power-based admission threshold for services carried over DCH. The system makes uplink power-based admission decision for the DCH service initiating an admission request. If the total power exceeds the sub-threshold, the admission control rejects the admission request; otherwise, the admission control accepts it. Every basic priority is configured with an admission threshold.

  More services can be admitted on DCH by increasing the value of this parameter,

  Less services can be admitted on DCH by decreasing the value of this parameter,

4.1.2.5 Cell Maximum Transmission Power

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX-> Cell Setup Parameters-> Cell Maximum Transmission Power

- Parameter Configuration

This parameter indicates the maximum transmission power allowed for all downlink physical channels of a cell, and is the total transmission power of a cell.

Decrease of this parameter will result in decrease of transmission power of all physical channels of cell.

Currently, the power amplification is 20W, so the value of this parameter must not be decreased.

4.1.2.6 Code Tree Reserved Ratio

- OMC Path

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->QOS Relevation Configuration->QOS Configuration->Access Control Related to Basic Priority->Code Tree Reserved Ratio

- Parameter Configuration

This parameter indicates the percentage of reserved code words, which is used in the admission control algorithm based on code table reserve ratio, in order to reserve some code words for UEs of certain service type. Another parameter used in the above algorithm is the reference SF layer, which means the code words reserved in cell are used for the services relative to reference SF layer. These two parameters need to be used together, and the code tree reserve ratio can be translated into the number of code words reserved for reference SF layer. This parameter corresponds to each basic priority.

4.1.2.7 Pathloss Scenario

- OMC Path

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX-> Modify Advanced Parameter-> Utran Cell-> Pathloss Scenario

- Parameter Configuration

  This parameter indicates the scenario of the serving cell. It is used to predict the downlink power increment.

  0: Dense City Zone

  1: Generic City Zone

  2: Suburb

  3: Country

4.1.2.8 Reference SF Layer Used for Code Reservation in CAC

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->Utran Cell->Utran Cell XXX->Modify Advanced Parameter->Utran Cell->Reference SF Layer Used for Code Reservation in CAC

- Parameter Configuration

  This parameter indicates the reference SF layer, which means the code words reserved in cells are used for the services relative to reference SF layer. This parameter is used in the admission control algorithm based on code tree reserve ratio, in order to reserve some code words for services of certain class. Another parameter used in the above algorithm is the number of reserved code words. These two parameters need to be used together, and the number of reserved code words can be translated into the number of code words reserved for reference SF layer.

4.1.2.9 Background Noise Automatic Adjust Switch

- OMC Path

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->Utran Cell->Utran Cell XXX->Modify Advanced Parameter->Utran Cell->Background Noise Automatic Adjust Switch

- Parameter Configuration

This parameter indicates whether the automatic noise floor adjustment switch is set to “ON”.

4.1.2.10 Original Background Noise

- OMC Path

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->Utran Cell->Utran Cell XXX->Modify Advanced Parameter->Utran Cell->Original Background Noise Configuration

- Parameter Configuration

This parameter indicates the original noise floor, that is, the default uplink RTWP of the cell when a cell is set up.

4.1.2.11 Basic Priority AC Index

- OMC Path

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Ultran Cell Global Information->Basic Priority AC Index

- Parameter Configuration

This parameter indicates the index of admission control parameters relative to basic priority. A set of admission control parameters may have several sets of values based on admission control requirements. Different cells can index diversified configurations by using this parameter. The parameters relative to this index are mapped from the basic priority.

4.1.2.12 Basic Priority Used in Admission Control

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->QOS Relevation Configuration->QOS Configuration->Access Control Related to Basic Priority->Basic Priority Used in Admission Control

- Parameter Configuration

  This parameter indicates the basic priority used in admission control algorithms. Its value ranges from 0–16, where 0–15 indicates the values of basic priorities, and 16 indicates handover.

4.1.2.13 Default Cpich Ec/N0 (dB)

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Modify Advanced Parameter->utranCell->Default CPICH Ec/No

- Parameter Configuration

  This parameter indicates the default CPICH Ec/N0 of a cell. It is used to predict the load increments generated by new service requests when valid CPICH Ec/N0 cannot be obtained during downlink admission control decision.

4.1.2.14 Measurement Priority of Neighboring Cell

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->neighbouring cellXXX->Measurement Priority of Neighboring Cell

- Parameter Configuration

The measurement priority of neighbor cells can be properly classified into three levels: 0, 1, and 2, in a descending order of priority, based on such conditions as the onsite signal strength of neighbor cells and geographical locations.

The neighbor cells ranking behind No.32 priority will be placed in the adjacent cell reservation list. If an adjacent cell list contains less than 32 cells, the cells with higher priorities in the adjacent cell reservation list shall be put back to the adjacent cell list.

4.1.2.15 DPCH Minimum DL Power(dB)

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->Modify Advanced Parameter->Power Control Related to Service and Diversity Mode->DPCH Minimum DL Power

- Parameter Configuration

  This parameter indicates the minimum downlink transmission power on DPCH, and is relative to service subclass.

4.1.2.16 Transport Time Delay

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->External UTRAN Cell->External UTRAN Cell XXX->Transport Time Delay

- Parameter Configuration

  This parameter indicates the satellite transmission delay on Iub interface. Satellite transmission delay is classified into three levels: 20ms (Low Earth Orbit Satellite and Terrestrial Transmission), 100ms (Medium Earth Orbit Satellite Transmission), 250ms (Geostationary Satellite Transmission)

4.1.2.17 P-CPICH Power

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->External UTRAN Cell->External UTRAN Cell XXX->Primary CPICH Power

- Parameter configuration

  This parameter indicates the power level of downlink PCPICH. It is a basic power value to be configured and is 33dbm by default.

4.1.2.18 Nominal Pathloss

- OMCR

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Modify Advanced Parameter->utranCell->Nominal Pathloss

- Parameter Configuration

The parameter is used when no pathloss is achieved, the system will use this value.

4.1.2.19 Threshold of the Number of the RRC Signaling Users Co-Exist in the Cell

- OMCR

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Modify Advanced Parameter->utranCell->Threshold of the Number of the RRC Signaling Users Co-Exist in the Cell

- Parameter Configuration

  The Parameter defines the maximum users with only signal in a cell. If at the same the number of users with only signal bigger than this value, the new user with signal will fail to admit.

  The bigger the value, the more users with only signal at one time In a cell.

The smaller the value, the less users with only signal at one time In a cell.

4.1.2.20 Statistic Window Size for RTWP

- OMCR

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX-> Modify Advanced Parameter->Cell-Realted Access Control-> Statistic Window Size for RTWP

- Parameter Configuration

The parameter defines the number of filted RTWP values which RNC should store for calculation.

4.1.2.21 Unloaded Threshold for Background Noise Measurement

- OMCR

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX-> Modify Advanced Parameter->Cell-Realted Access Control-> Unloaded Threshold for Background Noise Measurement

- Parameter Configuration

The parameter defines the load factor threshold to judge whether the load of a cell ie light or not

The bigger the value, the easer to judge the load is light.

The smaller the value, the harder to judge the load is light.

4.1.2.22 AMR Rate Adjustment Switch for RNC

- OMCR

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->Logical RNC Associated With PLMN Configuration Information

XXX->Logical RNC Associated With PLMN Configuration Information->AMR Rate Adjustment Switch for RNC

- Parameter Configuration

When the value of this parameter is "Closed", AMR dynamic rate adjustment will not be triggered due to UE internal measurement and NodeB special measurement; when the value of this parameter is "Open", AMR dynamic rate adjustment will be triggered due to the above-mentioned measurement. When this parameter is closed, AMR voice quality remains unchanged in any case; when this parameter is opened, AMR voice quality may slightly degrade according to different scenarios, but system capacity can be increased accordingly.

4.1.2.23 Switch of AMR Traffic Re-admission after AMR Rate Decrease

- OMCR

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->Modify Advanced Parameter->Global Access Control Information->Switch of AMR Traffic Re-admission after AMR Rate Decrease

- Parameter Configuration

This parameter indicates when AMR traffic is being admitted, if MaxBR is adopted but fails to be admitted due to soft resource limit and the switch is on, the lowest assigned rate will be admitted again.

4.1.2.24 Basic Priority AC Index(BPriAc)

- OMCR

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->QOS Relevation Configuration->QOS Configuration->Access Control Related to Basic Priority->Basic Priority AC Index

- Parameter Configuration

This parameter to index different configuration. The set of parameters corresponding to this index is mapped from the Basic Priority.

4.1.2.25 Report Period (NbCom)

- OMCR

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->Modify Advanced Parameter->NodeB Common Measurement Configuration->Report Period

- Parameter Configuration

This Prarmeter show the frequency of mearurement report sent by NodeB.

4.1.2.26 Choice Report Periodicity Scale (NbCom)

- OMCR

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->Modify Advanced Parameter->NodeB Common Measurement Configuration->Choice Report Periodicity Scale

- Parameter Configuration

This parameter indicates the period of measurement report sent by nodeb, the time is milisecond or minute.

4.1.2.27 Background Noise Automatic Adjustment Scene

- OMCR

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Cell Setup Parameters->Background Noise Automatic Adjustment Scene

- Parameter Configuration

This parameter indicates the Background Noise Automatic Adjustment Scene, which is used to distinguish difficult scene or easy scene for Background Noise

Automatically Adjusting. The easier to adjust, the less error between Background Noise and the real value, but mistakenly adjusting maybe happen.

0: Normal Scene

1: Easy Adjustment Scene

2: Difficult adjustment Scene

4.1.2.28 Cell Load Scene

- OMC Path

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Model Parameters->Cell Load Scene

- Parameter configuration

This parameter indicates whether the cell is high load cell or normal load cell. It should be configured according to the load condition of the cell.

If the cell always in high load condition, set this parameter with the value "1: High Load Cell", else the value of this parameter should be "0: Normal Load Cell".

4.2 Related Parameters of HSDPA Admission Control

4.2.1 List of Parameters

Abbreviated name	Parameter name
HsdschTrafLimit	HS-DSCH Traffic Limit
Node BSafeThr	Safe Threshold for Node B
HsdpaAcThresh	HSDPA Ac Threshold
HspdschBitRate	HS-PDSCH Bit Rate
SafePwrOfst	Offset of NodeB Safe Admission Threshold When DCH Has Higher AC Priority Than HS

HspaSptMeth	HSPA Support Method
HsdschTotPwrMeth	HSPA Total Downlink Power Allocation Method
MinHspaPwrRto	Minimum HSPA Total Downlink Power

4.2.2 Parameter Configuration

4.2.2.1 Maximum Number of Users on HS-DSCH

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Cell Ability and Cell Reselection->Maximum Number of Users on HS-DSCH

- Parameter Configuration

  This parameter indicates the maximum number of HS-DSCH users in the cell. It will be guaranteed by admission control mechanism.

4.2.2.2 Safe Threshold for Node B

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Modify Advanced Parameter->Load Control Information->Safe Threshold for NodeB

- Parameter Configuration

  This parameter indicates the safe threshold of HSDPA power, that is, the maximum HSDPA power when Node B is in free mode. In any case, HSDPA power must not exceed this threshold.

  Decrease of this parameter will result in decrease of the maximum HSDPA power that can be used by Node B.

Currently, this parameter already reaches its maximum limit on Node B side, so it shall not be increased any more.

4.2.2.3 HSDPA AC Threshold

- OMC Path

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->QOS Relevation Configuration->QOS Configuration->Access Control Related to Basic Priority->HSDPA AC Threshold

- Parameter Configuration

This parameter indicates the downlink power admission control threshold of UEs carried over HSDPA with different basic priorities. If the downlink load of a cell exceeds this threshold, the new incoming HSDPA service will be rejected.

Increase of this parameter will result in increase of the HSDPA downlink admission threshold relative to the basic priority.

Decrease of this parameter will result in decrease of the HSDPA downlink admission threshold relative to the basic priority.

4.2.2.4 HS-PDSCH Bit Rate

- OMC Path

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Modify Advanced Parameter->HSPA Configuration Information In A Cell->HS-PDSCH Bit Rate

- Parameter Configuration

This parameter indicates the average data rate of each HS-PDSCH. Its default value is 700kbps.

Decrease of this parameter will result in decrease of the average data rate on each HS-PDSCH, thus affecting the overall data rate of UEs.

Currently, this default value of this parameter already reaches its maximum limit that can be carried by physical layers, so it shall not be increased any more.

4.2.2.5 Offset of Node B Safe Admission Threshold When DCH Has Higher AC Priority Than HS

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->QOS Relevation Configuration->QOS Configuration->Access Control Related to Basic Priority->Offset of NodeB Safe Admission Threshold When DCH Has Higher AC Priority Than HS

- Parameter Configuration

  This parameter indicates the offset of Node B safe admission threshold when the DCH admission priority of HS cells is higher than HS priority. It is one of the conditions used for DCH admission decision. This parameter needs to be configured based on basic priority.

4.2.2.6 HSPA Support Method

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->External UTRAN Cell->External UTRAN Cell XXX->HSPA Support Method

- Parameter Configuration

  0: Not Support HSUPA and HSDPA

  1: Support HSDPA and DCH

  3: Support HSUPA , HSDPA and DCH

4.2.2.7 HSPA Total Downlink Power Allocation Method

- OMCR

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->Modify Advanced Parameter->RNC Radio Resource Management->HSPA Total Downlink Power Allocation Method

- Parameter Configuration

  The parameter indicates the method of HSPA total downlink power allocation. In order to make full use of power, “2:NodeB free Mode” is reconmanded.

4.2.2.8 Minimum HSPA Total Downlink Power

- OMCR

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Modify Advanced Parameter->HSPA Configuration Information In A Cell->Minimum HSPA Total Downlink Power

- Parameter Configuration

  The parameter indicates the minimum power which is used for HS-PDSCH,HS-SCCH,E-AGCH,E-RGCH and E-HICH. It is a percentage of total downlink power of a cell.

4.3 Related Parameters of HSUPA Admission Control

4.3.1 List of Parameters

Abbreviated name	Parameter name
EdchTrafLimit	Maximum Number of Users on E-DCH
EdchAcThresh	E-DCH AC Threshold
NumofErgHich	Number of E-RGCH/E-HICH
MaxRTWP	Maximum Target Received Total Wideband Power
EdchNormBitRate	E-DCH Uplink Nominal Bit Rate

4.3.2 Parameter Configuration

4.3.2.1 Maximum Number of Users on E-DCH

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Cell Ability and Cell Reselection->Maximum Number of Users on E-DCH

- Parameter Configuration

  This parameter indicates the maximum number of E-DCH users in the cell. It will be guaranteed by admission control mechanism.

4.3.2.2 E-DCH AC Threshold

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->QOS Relevation Configuration->QOS Configuration->Access Control Related to Basic Priority->E-DCH AC Threshold

- Parameter Configuration

  This parameter indicates the threshold for E-DCH admission. If the uplink load of system exceeds this threshold after a new E-DCH call request is admitted, this call request will be rejected. The rejected call can be forcedly released or put in queue according to its priority.

4.3.2.3 Number of E-RGCH/E-HICH

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Cell Ability and Cell Reselection->Number of E-RGCH/E-HICH

- Parameter Configuration

  This parameter indicates the number of E-RGCHs or E-HICHs in a cell.

4.3.2.4 Maximum Target Received Total Wideband Power

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Modify Advanced Parameter->HSPA Configuration Information In A Cell->Maximum Target Received Total Wideband Power

- Parameter Configuration

  This parameter indicates the maximum uplink receive power of the target bandwidth in a cell. It is a value in contrast to the noise floor of Node B and is applicable to free scheduling of Node B. The default value of this parameter is 6dB.

  Increase of this parameter will result in increase of the available uplink receive power of a cell during Node B scheduling.

  Decrease of this parameter will result in decrease of the available uplink receive power of a cell during Node B scheduling.

4.3.2.5 E-DCH Uplink Nominal Bit Rate

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->Qos Relevance Configuration->Qos Configuration->Qos Configuration XXX->E-DCH Uplink Nominal Bit Rate

- Parameter Configuration

  This parameter indicates the nominal bit rate for interactive/background services on E-DCH. It is mapped from the Basic Priority, higher basic priority traffic has higher nominal bit rate. In the process of NodeB HSUPA quick scheduling, EdchNormBitRate is used as minmum guarantee bit rate.

4.4 Related Parameters of MBMS Admission Control

4.4.1 List of Parameters

Abbreviated name	Parameter name
MbmsTrafLimit	MBMS Traffic Number Limit
MbmsThrputThresh	MBMS Throughput Threshold
MbmsAcThresh	MBMS AC Threshold

4.4.2 Parameter Configuration

4.4.2.1 MBMS Traffic Number Limit

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Modify Advanced Parameter->MBMS Configuration Information In A Cell->MBMS Traffic Number Limit

- Parameter Configuration

  This parameter indicates the maximum number of MBMS services in a cell. The system guarantees that the number of MBMS UEs admitted in a cell is not larger than this value through admission control.

  Decrease of this parameter will result in decrease of the maximum number of MBMS services that can be admitted by a cell.

  Increase of this parameter will result in increase of the maximum number of MBMS services that can be admitted by a cell.

4.4.2.2 MBMS Throughput Threshold

- OMC Path

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Modify Advanced Parameter->MBMS Configuration Information In A Cell->MBMS Throughput Threshold

- Parameter Configuration

  This parameter indicates the maximum data throughput of MBMS services in a cell.

4.4.2.3 MBMS AC Threshold

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->QOS Relevation Configuration->QOS Configuration->Access Control Related to Basic Priority->MBMS AC Threshold

- Parameter Configuration

  This parameter indicates the threshold for MBMS admission. If the downlink load of system exceeds this threshold after a new MBMS call request is admitted, this call request will be rejected. The rejected call can be forcedly released or put in queue according to its priority.

  More P-T-P MBMS services can be admitted by increasing this parameter.

  Less P-T-P MBMS services can be admitted by decreasing this parameter.

4.5 Related Parameters of Admission Control when the Cells in Different PLMNs Share the CE resources

4.5.1 List of Parameters

Abbreviated name	Parameter name
PLMNNum	Number of PLMN for RAN Sharing
MCC4RANSharing [4]	MCC for RAN Sharing
MNC4RANSharing [4]	MNC for RAN Sharing

MinCEPercent[4]	Minimal percent of CE can be used by the PLMN

4.5.2 Parameter Configuration

4.5.2.1 Number of PLMN for RAN Sharing

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->NodeB Configuration-> NodeB Configuration XXX -> Number of PLMN for RAN Sharing

- Parameter Configuration

  This parameter indicates number of PLMN for RAN sharing while carrier sharing

4.5.2.2 MCC for RAN Sharing

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->NodeB Configuration-> NodeB Configuration XXX -> MCC for RAN Sharing

- Parameter Configuration

  This parameter indicates MCC for RAN sharing while carrier sharing

4.5.2.3 MNC for RAN Sharing

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->NodeB Configuration-> NodeB Configuration XXX -> MNC for RAN Sharing

- Parameter Configuration

  This parameter indicates MNC for RAN sharing while carrier sharing

4.5.2.4 Minimal percent of CE can be used by the PLMN

- OMC Path

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->NodeB Configuration-> NodeB Configuration XXX -> Minimal percent of CE can be used by the PLMN

- Parameter Configuration

  This parameter indicates the minimal percent of CE can be used by the PLMN for RAN Sharing while carrier sharing.

4.5.2.5 Share Mode of CE Resource for Multi-Operators

- OMC Path

  Path:

- Parameter Configuration

  This parameter indicates the minimal percent of CE can be used by the PLMN for RAN Sharing while carrier sharing.

4.5.2.6 Minimal percent of CE can be used by the PLMN

- OMC Path

  Path:

- Parameter Configuration

  This parameter indicates the minimal percent of CE can be used by the PLMN for RAN Sharing while carrier sharing.

4.6 Related Parameters of DOWNLINK ENHANCED CELL_FACH admission control

4.6.1 List of Parameters

Abbreviated name	Parameter name
DLEFACHUserNum	Maximum Number of Users on Downlink Enhanced CELL_FACH

4.6.2 Parameter Configuration

4.6.2.1 Maximum Number of Users on Downlink Enhanced CELL_FACH

- OMC Path

Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Modify Advanced Parameter->utranCell->Maximum Number of Users on Downlink Enhanced CELL_FACH

- Parameter Configuration

This parameter indicates the maximum number of Users can be carried on Downlink Enhanced CELL_FACH. When user number on DOWNLINK ENHANCED CELL_FACH(HS-DSCH channel in CELL_FACH state)(Dedicated H-RNTI in ENHANCED CELL_FACH state Allocated)is over DLEFACHUserNum, then DOWNLINK ENHANCED CELL_FACH reject any new service; else, DOWNLINK ENHANCED CELL_FACH can access new service. This parameter should be set according DL EFACH CAPACITY Requirement. It's suggested to set to the Maximum Number of Users that the cell can support on Downlink Enhanced CELL_FACH

4.7 Related Parameters of UPLINK ENHANCED CELL_FACH admission control

4.7.1 List of Parameters

Abbreviated name	Parameter name
CEdchUserNum	Maximum Number of Users with Traffic on Common E-DCH in Enhancecd Uplink CELL_FACH State

4.7.2 Parameter Configuration

4.7.2.1 Maximum Number of Users with Traffic on Common E-DCH in Enhancecd Uplink CELL_FACH State

- OMCR

  Path: View->Configuration Management->RNC NE->RNC Radio Resource Management->UltranCell->UltranCellXXX->Modify Advanced Parameter->HSPA Configuration Information In A Cell->Maximum Number of Users with Traffic on Common E-DCH in Enhancecd Uplink CELL_FACH State

- Parameter Configuration

  This parameter indicates the maximum number of users with traffic on common E-DCH in enhanced uplink CELL_FACH state in the cell. This parameter should be set according UL EFACH CAPACITY Requirement. And suggested to set to the maximum enhanced uplink CELL_FACH user number that NodeB can support in one cell.

5 Counter Description

Counter No.	Description
C310080066	Number of failed RRC connection preparation,Due To Admission Control
C310080067	Number of failed RRC connection preparation,Due To Codes
C310080068	Number of failed RRC connection preparation,Due To DL POWER Shortage
C310080069	Number of failed RRC connection preparation,Due To UL Interfere
C310080070	Number of failed RRC connection preparation,Due To UL CE Shortage
C310080071	Number of failed RRC connection preparation,Due To DL CE Shortage
C310110334	Number of failed RAB assignment setup in cell for CS domain,No Resource Available
C310110335	Number of failed RAB assignment setup in cell for CS domain,No Resource Available In SRNC
C310110336	Number of failed RAB assignment setup in cell for CS domain,Code Resource Congestion
C310110337	Number of failed RAB assignment setup in cell for CS domain,Downlink CE Congestion
C310110338	Number of failed RAB assignment setup in cell for CS domain,Downlink Power Resource Congestion
C310110339	Number of failed RAB assignment setup in cell for CS domain,Other Downlink Resource Congestion
C310110340	Number of failed RAB assignment setup in cell for CS domain,Uplink CE Congestion
C310110341	Number of failed RAB assignment setup in cell for CS domain,Uplink Power Resource Congestion
C310110342	Number of failed RAB assignment setup in cell for CS domain,Other Uplink Resource Congestion
C310110343	Number of failed RAB assignment setup in cell for CS domain,DCH user number limit
C310110344	Number of failed RAB assignment setup in cell for CS domain,HSDPA user number limit

C310110345	Number of failed RAB assignment setup in cell for CS domain,HSUPA user number limit
C310110346	Number of failed RAB assignment setup in cell for CS domain,No Resource Available In DRNC
C310110347	Number of failed RAB assignment setup in cell for CS domain,Access Restricted Due to Shared Networks
C310110368	Number of failed RAB assignment setup in cell for CS domain,UP CE Limit
C310110391	Number of failed RAB assignment setup in cell for PS domain,No Resource Available
C310110392	Number of failed RAB assignment setup in cell for PS domain,No Resource Available In SRNC
C310110393	Number of failed RAB assignment setup in cell for PS domain,Code Resource Congestion
C310110394	Number of failed RAB assignment setup in cell for PS domain,Downlink CE Congestion
C310110395	Number of failed RAB assignment setup in cell for PS domain,Downlink Power Resource Congestion
C310110396	Number of failed RAB assignment setup in cell for PS domain,Other Downlink Resource Congestion
C310110397	Number of failed RAB assignment setup in cell for PS domain,Uplink CE Congestion
C310110398	Number of failed RAB assignment setup in cell for PS domain,Uplink Power Resource Congestion
C310110399	Number of failed RAB assignment setup in cell for PS domain,Other Uplink Resource Congestion
C310110400	Number of failed RAB assignment setup in cell for PS domain,DCH user number limit
C310110401	Number of failed RAB assignment setup in cell for PS domain,HSDPA user number limit
C310110402	Number of failed RAB assignment setup in cell for PS domain,HSUPA user number limit
C310110403	Number of failed RAB assignment setup in cell for PS domain,No Resource Available In DRNC

C310110404	Number of failed RAB assignment setup in cell for PS domain,Access Restricted Due to Shared Networks
C310110416	Number of failed RAB assignment setup in cell for PS domain,Iub Congestion
C310170629	Number of failed HSDPA RAB assignment setup in cell for PS domain,No Resource Available
C310170630	Number of failed HSDPA RAB assignment setup in cell for PS domain,No Resource Available In SRNC
C310170631	Number of failed HSDPA RAB assignment setup in cell for PS domain,Code Resource Available
C310170632	Number of failed HSDPA RAB assignment setup in cell for PS domain,Downlink CE Congestion
C310170633	Number of failed HSDPA RAB assignment setup in cell for PS domain,Downlink Power Resource Congestion
C310170634	Number of failed HSDPA RAB assignment setup in cell for PS domain,Other Downlink Resource Congestion
C310170635	Number of failed HSDPA RAB assignment setup in cell for PS domain,Uplink CE Congestion
C310170636	Number of failed HSDPA RAB assignment setup in cell for PS domain,Uplink Power Resource Congestion
C310170637	Number of failed HSDPA RAB assignment setup in cell for PS domain,Other Uplink Resource Congestion
C310170638	Number of failed HSDPA RAB assignment setup in cell for PS domain,HSDPA user number limit
C310170639	Number of failed HSDPA RAB assignment setup in cell for PS domain,DCH user number limit
C310170640	Number of failed HSDPA RAB assignment setup in cell for PS domain,No Resource Available In DRNC
C310170641	Number of failed HSDPA RAB assignment setup in cell for PS domain,Access Restricted Due to Shared Networks
C310170656	Number of failed HSDPA RAB assignment setup in cell for PS domain,UP CE Limit
C310170674	Number of failed HSUPA RAB assignment setup in cell for PS domain,No Resource Available

C310170675	Number of failed HSUPA RAB assignment setup in cell for PS domain,No Resource Available In SRNC
C310170676	Number of failed HSUPA RAB assignment setup in cell for PS domain,Code Resource Congestion
C310170677	Number of failed HSUPA RAB assignment setup in cell for PS domain,Downlink CE Congestion
C310170678	Number of failed HSUPA RAB assignment setup in cell for PS domain,Downlink Power Resource Congestion
C310170679	Number of failed HSUPA RAB assignment setup in cell for PS domain,Other Downlink Resource Congestion
C310170680	Number of failed HSUPA RAB assignment setup in cell for PS domain,Uplink CE Congestion
C310170681	Number of failed HSUPA RAB assignment setup in cell for PS domain,Uplink Power Resource Congestion
C310170682	Number of failed HSUPA RAB assignment setup in cell for PS domain,Other Uplink Resource Congestion
C310170683	Number of failed HSUPA RAB assignment setup in cell for PS domain,HSUPA user number limit
C310170684	Number of failed HSUPA RAB assignment setup in cell for PS domain,DCH user number limit
C310170685	Number of failed HSUPA RAB assignment setup in cell for PS domain,No Resource Available In DRNC
C310170686	Number of failed HSUPA RAB assignment setup in cell for PS domain,Access Restricted Due to Shared Networks
C310175769	Number of failed HSDPA RAB assignment setup in cell for CS domain,No Resource Available
C310175770	Number of failed HSDPA RAB assignment setup in cell for CS domain,No Resource Available In SRNC
C310175771	Number of failed HSDPA RAB assignment setup in cell for CS domain,Code Resource Congestion
C310175772	Number of failed HSDPA RAB assignment setup in cell for CS domain,Downlink CE Congestion
C310175773	Number of failed HSDPA RAB assignment setup in cell for CS domain,Downlink Power Resource Congestion
C310175774	Number of failed HSDPA RAB assignment setup in cell for CS domain,Other Downlink Resource Congestion

C310175775	Number of failed HSDPA RAB assignment setup in cell for CS domain,Uplink CE Congestion
C310175776	Number of failed HSDPA RAB assignment setup in cell for CS domain,Uplink Power Resource Congestion
C310175777	Number of failed HSDPA RAB assignment setup in cell for CS domain,Other Uplink Resource Congestion
C310175778	Number of failed HSDPA RAB assignment setup in cell for CS domain,HSDPA user number limit
C310175779	Number of failed HSDPA RAB assignment setup in cell for CS domain,DCH user number limit
C310175780	Number of failed HSDPA RAB assignment setup in cell for CS domain,No Resource Available In DRNC
C310175781	Number of failed HSDPA RAB assignment setup in cell for CS domain,Access Restricted Due to Shared Networks
C310175814	Number of failed HSUPA RAB assignment setup in cell for CS domain,No Resource Available
C310175815	Number of failed HSUPA RAB assignment setup in cell for CS domain,No Resource Available In SRNC
C310175816	Number of failed HSUPA RAB assignment setup in cell for CS domain,Code Resource Congestion
C310175817	Number of failed HSUPA RAB assignment setup in cell for CS domain,Downlink CE Congestion
C310175818	Number of failed HSUPA RAB assignment setup in cell for CS domain,Downlink Power Resource Congestion
C310175819	Number of failed HSUPA RAB assignment setup in cell for CS domain,Other Downlink Resource Congestion
C310175820	Number of failed HSUPA RAB assignment setup in cell for CS domain,Uplink CE Congestion
C310175821	Number of failed HSUPA RAB assignment setup in cell for CS domain,Uplink Power Resource Congestion
C310175822	Number of failed HSUPA RAB assignment setup in cell for CS domain,Other Uplink Resource Congestion
C310175823	Number of failed HSUPA RAB assignment setup in cell for CS domain,HSUPA user number limit
C310175824	Number of failed HSUPA RAB assignment setup in cell for CS domain,DCH user number limit

C310175825	Number of failed HSUPA RAB assignment setup in cell for CS domain,No Resource Available In DRNC
C310175826	Number of failed HSUPA RAB assignment setup in cell for CS domain,Access Restricted Due to Shared Networks
C310336840	Number of outgoing intra-NodeB intra frequency hard handover preparation failed,access control refuse
C310336845	Number of outgoing intra-NodeB inter frequency hard handover preparation failed,access control refuse
C310336850	Number of outgoing inter-NodeB,intra-Rnc intra frequency hard handover preparation failed,access control refuse
C310336855	Number of outgoing inter-NodeB,intra-Rnc inter frequency hard handover preparation failed,access control refuse
C310336860	Number of outgoing inter-Rnc intra frequency hard handover preparation failed,access control refuse
C310336865	Number of outgoing inter-Rnc inter frequency hard handover preparation failed,access control refuse
C310335701	Number of outgoing intra frequency hard handover attempt,Admission failed
C310335706	Number of outgoing intra frequency hardhandover failed,Admission failed

6 Glossary

A

ARP Allocation/Retention Priority

D

DRBC Dynamic Radio Bearer Control

G

GBR Guaranteed bit rate

M

MBMS Multimedia Broadcast Multicast Service

MBR Maximum bit rate

N

NRT Non Real-time Traffic

R

RT Real Time Traffic

RTWP Received Total Wideband Power

T

TCP Transmitted Carrier Power

TCP Transmit Code Power