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ETSI

European Telecommunications Standards Institute

ETSI Secretariat: B.P.152 . F - 06561 Valbonne Cedex . France

TP. + 33 92 94 42 00 TF. + 33 93 65 47 16 Tx. 47 00 40 F

PREFATORY NOTE

ETSI has constituted stable and consistent documents which give specifications for the implementation of the European Cellular Telecommunications System. Historically, these documents have been identified as "GSM recommendations".

Some of these recommendations may subsequently become Interim European Telecommunications Standards (I-ETSs) or European Telecommunications Standards (ETSs), whilst some continue with the status of ETSI-GSM Technical Specifications. These ETSI-GSM Technical Specifications are for editorial reasons still referred to as GSM recommendations in some current GSM documents.

The numbering and version control system is the same for ETSI-GSM Technical Specifications as for "GSM recommendations".

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Explanatory notes are contained in brackets {}.

1. SCOPE :

This recommendation specifies the Radio sub-system link control implemented in the Mobile Station (MS), Base Station (BS) and Mobile Switching Centre (MSC) of the GSM system.

GSM 05.08-DCS consists of GSM 05.08 with sections 1, 6, and 9 and pages 27 and 37 of Appendix A of this document replacing those in GSM 05.08.

2. GENERAL :

The radio sub-system link control aspects that are addressed are as follows :

- Handover
- RF Power control
- Radio link Failure
- Cell selection and re-selection in Idle mode.

Handover is required to maintain a call in progress as a MS passes from one cell coverage area to another and may also be employed to meet network management requirements, e.g. relief of congestion.

Handover may occur during a call from TCH to TCH, it may also occur from DCCH to DCCH, e.g. during the initial signalling period at call set-up.

The handover may be either from a channel on one cell to another channel on a surrounding cell, or between channels on the same cell. Examples are given of handover strategies, however, these will be determined in detail by the network operator.

Adaptive control of the RF transmit power from an MS and optionally from the BS is implemented in order to optimise the uplink and downlink performance and minimise the effects of co-channel interference in the system.

The criteria for determining radio link failure are specified in order to ensure that calls which fail either from loss of radio coverage or unacceptable interference are satisfactorily handled by the network. Radio link failure may result in either re-establishment or release of the call in progress.

Procedures for cell selection and re-selection whilst in Idle mode (i.e not actively processing a call), are specified in order to ensure that a mobile is camped on a cell with which it can reliably communicate on both the radio uplink and downlink.

Information signalled between the MS and BS is summarised in Tables 1 and 2. A full specification of the Layer 1 header is given in GSM Recommendation 04.04, and of the Layer 3 fields in GSM Recommendation 04.08. Appendix B contains some illustrative examples of MS procedures in SDL form.

6. CELL SELECTION AND RE-SELECTION

6.1 Overall process

Whilst in Idle mode (i.e. not engaged in communicating with a BS), an MS shall implement the cell selection and re-selection procedures described in this section.

The procedures ensure that the MS is camped on a cell from which it can reliably decode downlink data and with which it has a high probability of communications on the uplink. The choice of cell is determined by the path loss criterion in section 6.4. Once the MS is camped on a cell, access to the network is allowed.

Definitions:

An "available" PLMN is one for which the MS has found:
at least one cell which is unbarred according to the value of CELL BAR ACCESS and which has the parameter C1 (see section 6.4) greater than 0, and whose location area identification is not a member of the list of "forbidden location areas for national roaming".

A "suitable" cell is one which:
- Is part of the selected PLMN
- Is unbarred
- Has the parameter C1>0
- Has a location area identification which is not a member of the list of "forbidden location areas for national roaming" (see GSM 04.08)

An MS is said to be camped on a cell when it has determined that the cell is suitable ~~(i.e. the conditions specified in Section 6.2 are satisfied)~~ and stays tuned to a BCCH + CCCH of that cell. While camped on a cell, an MS may receive paging messages or under certain conditions make random access attempts on a RACH of that cell, and read BCCH data from that cell.

The MS shall not use the discontinuous reception (DRX) mode of operation (i.e. powering itself down when it is not expecting paging messages from the network) while performing the algorithm of sections 6.2 and 6.3. However use of powering down is permitted at all other times in idle mode.

An example procedure covering sections 6.2 and 6.3 below is shown in Figure B4. An example procedure covering section 6.6 is shown in figure B5.

For the purposes of cell selection and reselection, the MS is required to maintain an average of received signal strengths for all monitored frequencies. These quantities termed the "receive level averages, shall be unweighted averages of the received signal strengths measured in dBm.

The cell selection and reselection procedures make use of the "BCCH Allocation" (BA) list. There are in fact two BA lists which may or may not be identical, depending on choices made by the PLMN operator.

(i) BA (BCCH) - This is the BA sent in System Information Messages on the BCCH. It is the list of BCCH carriers in use by a given PLMN in a given geographical area. It is used by the MS in cell selection and reselection.

(ii) BA (SACCH) - This is the BA sent in System Information Messages on the SACCH and indicates to the MS which BCCH carriers are to be monitored for handover purposes (see Section 7 & 8)

Note: When the MS goes on to a TCH or SDCCH, it shall start monitoring BCCH carriers in BA (BCCH) until it gets its first BA (SACCH) message.

Note: The Access Control Class bit (See GSM rec 04.08) has no impact on the algorithms in section 6 i.e. the MS shall camp on the cell indicated by the algorithm, even if the relevant Access Control Class bit is set.

6.2 Cell Selection - No BCCH Information Available

An MS which is not currently camped on a cell (e.g. at switch-on) shall,in the case where it has no BCCH information stored, perform the following algorithm, an example of which is shown in Figure B4.

However, if no SIM is present, the MS shall instead perform the algorithm of section 6.8.

The MS shall search all ~~124~~374 RF channels in the ~~GSM~~DCS 1800 system, take readings of received RF signal strength on each RF channel, and calculate the received level average for each. The averaging is based on at least five measurement samples per RF carrier spread over 3 to 5 s, the measurement samples from the different RF carriers being spread evenly during this period.

The MS shall tune to the carrier with the highest average received level and determine whether or not this carrier is a BCCH carrier (e.g. by searching for frequency correction bursts). If it is a BCCH carrier, the MS shall attempt to synchronise to this carrier and read the BCCH data. The MS shall camp on the cell provided it can successfully decode the BCCH data and this data indicates that the cell is suitable. (If the cell is part of the selected PLMN but is not suitable , the MS shall use the BCCH Allocation obtained from this cell and subsequently only search these BCCH carriers. If the cell is not part of the selected PLMN, the PLMN identity shall be noted for use in any subsequent PLMN reselection.) Otherwise the MS shall tune to the next highest carrier etc.

{CELL_BAR_ACCESS may be employed to bar a cell that is only intended to handle handover traffic etc. A typical example of this could be an umbrella cell which encompasses a number of microcells.}

If at least the ~~30~~40 strongest RF channels have been tried, but no suitable cell has been found, provided the RF channels which have been searched include at least one BCCH carrier, the available PLMN's ~~shall~~ may be presented to the user according to the requirements of GSM Rec 02.11, and the algorithm of section 6.8 shall be performed, otherwise more RF channels shall be searched until at least one BCCH carrier is found.

{~~30~~40 RF channels are specified to give a high probability of finding all suitable PLMN's, without making the process take too long.}

{Note: If extra frequencies are defined for the ~~GSM~~DCS 1800 system which are allowed to carry BCCH data, then this algorithm may need to be amended.}

GSM recommendation 02.11 describes the requirements for PLMN selection. The location updating procedure is defined in GSM Recommendation 04.08 and the location area identification (LAI) is defined in GSM Recommendation 03.03.
Whenever a new PLMN is selected (according to the procedures in GSM recommendation 02.11) the MS shall camp on a suitable cell of the new PLMN ~~if possible~~ if such a cell is known by the MS, or shall otherwise perform cell selection.

6.3 Cell Selection - BCCH Information Available

The MS may include optional storage of BCCH carrier information when switched off. For example, the MS may store the BCCH carriers in use by the PLMN selected when it was last active in the DCS 1800~~GSM~~ network. A MS may also store BCCH carriers for more than one PLMN which it has selected previously (e.g. at national borders or when more than one PLMN serves a country) in which case the BCCH carrier lists must be kept quite separate.

If an MS includes a BCCH carrier list of the selected PLMN it shall perform the same algorithm as in section 6.2 except that only the BCCH carriers in the list need to be searched.

If an MS decodes BCCH data from a cell of the selected PLMN but is unable to camp on that cell, the BA of that cell shall be examined. Any BCCH carriers in the BA which are not in the MS's list of BCCH carriers to be searched shall be added to the list.

If no suitable cell has been found after all the BCCH carriers in the list have been searched, the MS shall perform the algorithm of section 6.2, i.e. acting as if there were no stored BCCH carrier information. Since information concerning a number of channels is already known to the MS, it may assign high priority to measurements on those of the ~~30~~40 strongest carriers from which it has not previously made attempts to obtain BCCH information, and omit repeated measurements on the known ones.

The BCCH carrier list for a given PLMN stored in an MS shall be reset and updated whenever the MS, camping on a BCCH carrier, retrieves new BCCH data from that PLMN.

6.4 Path Loss Criterion for Cell Selection and Reselection

The path loss criterion parameter C1 used for cell selection and reselection is defined by:

C1 = (A - Max(B,O))

where A = Received Level Average - RXLEV_ACCESS_MIN
B = MS_TXPWR_MAX_CCH - P

RXLEV_ACCESS_MIN = Minimum received level at the MS required for access to the system.

MS_TXPWR_MAX_CCH = Maximum TXPWR level an MS may use when accessing the system until otherwise commanded.

P = Maximum RF output power of the MS.

All values are expressed in dBm.

{This parameter is used to ensure that the MS is camped on the cell with which it has the highest probability of successful communication on uplink and downlink.}

6.5 Downlink Signalling Failure

The downlink signalling failure criterion is based on the downlink signalling failure counter DSC. When the MS camps on a cell, DSC shall be initialized to a value equal to the nearest integer to 90/N where N is the BS_PA_MFRMS parameter for that cell (see GSM Rec 05.02). Thereafter, whenever the MS attempts to decode a message in its paging subchannel; if a message is successfully decoded DSC is increased by 1, (however never beyond the nearest integer to 90/N), otherwise DSC is decreased by 4. When DSC reaches 0, a downlink signalling failure shall be declared.

{The network sends the paging subchannel for a given MS every BS_PA_MFRMS multiframes. The network is required to send a valid signalling frame in every block of every paging subchannel (see GSM Rec 04.08), and the MS is required to attempt to decode a message every time its paging subchannel is sent.}

Downlink signalling failure shall result in cell reselection. (See section 6.6)

6.6 Cell Reselection in Idle Mode

6.6.1 Monitoring of Received Level and BCCH data

Whilst in Idle Mode an MS shall continue to monitor all BCCH carriers as indicated by the BCCH Allocation (BA - See Table 1). A running average of received level in the preceding 5 to 60 seconds shall be maintained for each carrier in the BCCH Allocation.

For the serving cell receive level measurement samples shall be taken at least for each paging block of the MS and the receive level average shall be determined using samples collected over a period of 5 s or five consecutive paging blocks of that MS, whichever is the greater period.

At least 5 received level measurement samples are required per receive level average value. New sets of receive level average values shall be calculated as often as possible.

The same number of measurement samples shall be taken for all non serving cell BCCH carriers, and the samples allocated to each carrier shall as far as possible be uniformly distributed over each evaluation period.

The list of the 6 strongest carriers shall be updated at least every minute and may be updated more frequently.

In order to minimise power consumption, MSs that employ DRX (i.e. power down when paging blocks are not due) should monitor the signal strengths of non-serving cell BCCH carriers during the frames of the Paging Block that they are required to listen to. Received level measurement samples can thus be taken on several non-serving BCCH carriers and on the serving carrier during each Paging Block.

The MS shall include the BCCH carrier of the current serving cell (i.e. the cell the MS is camped on) in this measurement routine.

The MS shall attempt to decode the full BCCH data of the serving cell at least every 30 seconds.

The MS shall attempt to decode the BCCH data block that contains the parameters affecting cell reselection for each of the 6 strongest non-serving cell BCCH carriers at least every 5 minutes. When the MS recognizes that a new BCCH carrier has become one of the 6 strongest, the BCCH data shall be decoded for the new carrier within 30 seconds.

The MS shall attempt to check the BSIC for each of the 6 strongest non serving cell BCCH carriers at least every 30 seconds, to confirm that it is monitoring the same cell. If a change of BSIC is detected then the carrier shall be treated as a new carrier and the BCCH data redetermined.

When requested by the user, the MS shall monitor the ~~30~~40 strongest ~~GSM~~DCS 1800 carriers to determine, within ~~15~~20 seconds, which PLMN's are available. This monitoring shall be done so as to minimise interruptions to the monitoring of the PCH.

6.6.2 Reselection Algorithm

The MS shall perform the following algorithm to ensure that it is camped on the most appropriate cell. An example of the algorithm is given in Figure B5.
At least every 5 s the MS shall calculate the value of C1 for the serving cell and re-calculate C1 values for non serving cells (if necessary). The MS shall then check for conditions (i) and (iv) below.

The MS shall reselect a new cell if any of the following occur:

(i) Path loss criterion (C1) for current serving cell falls below zero for a period of 5 seconds.

(ii) The MS detects a downlink signalling failure (see 6.5).

(iii) The current serving cell becomes barred as indicated by the BCCH data.

(iv) The calculated value of C1 for a non-serving suitable cell exceeds the value of C1 for the serving cell for a period of 5 seconds, except in the case of the new cell being in a different location area in which case the C1 value for the new cell shall exceed the C1 value of the serving cell by at least CELL_RESELECT_HYSTERESIS dB as defined by the BCCH data from the current serving cell, for a period of 5 seconds.

(v) A random access attempt is still unsuccessful after "MAX retrans" repetitions; "MAX retrans" being a parameter broadcast on BCCH.

In case (iv) above, cell reselection shall not take place if there was a cell reselection within the previous 15 seconds. In the other cases, the cell reselection shall take place immediately, but the cell that the MS was camped on shall not be returned to within 5 seconds if another suitable cell can be found.

If the chosen new cell is in a different location area to the location area (old LA) of the last cell on which the MS was camped, (old serving cell) and there is a suitable cell of the old LA, the new cell shall only be selected if C1 on the new cell exceeds C1 on every suitable cell of the old LA by at least CELL_RESELECT_HYSTERESIS as defined by the BCCH data from the current serving cell.

In all cases, the cell with the highest value of C1 (among the cells being monitored according to the algorithm in section 6.6.1) which is suitable and which satisfies the other constraints shall be used.

Before camping on the cell after re-selection, the MS shall attempt to decode the full set of data of the BCCH . The MS shall check that the parameters affecting cell reselection are unchanged. If a change is detected the MS shall check if the cell re-selection criterion is still valid using the changed parameters.

If these conditions are all fulfilled, the MS shall camp on the cell. It may then be required to attempt a location update. (See GSM Rec 04.08.). If the conditions are not satisfied, the MS shall repeat this process for the cell with the next highest value of C1.

Once the MS has re-tuned to the chosen cell, it shall monitor its paging subgroup (if known) for that cell. If the MS receives a page before having decoded the full BCCH data for the new cell, the MS shall store the page and respond, if permitted, once the full BCCH data has been decoded. If not permitted, no page response shall be made.

If no suitable cell is found within 10 seconds, the cell selection algorithm of section 6.2 shall be performed. Since information concerning a number of channels is already known to the MS, it may assign high priority to measurements on those of the ~~30~~40 strongest carriers from which it has not previously made attempts to obtain BCCH information, and omit repeated measurements on the known ones.

Note - The tolerance on all the above timings is +/-10%.

6.7 Release of TCH and SDCCH

6.7.1 Normal Case

When the MS releases a TCH or SDCCH and returns to idle mode, it shall as quickly as possible camp on a cell of the selected PLMN which is not barred and has C1 greater than zero. If such a cell exists in the "stored location area" (see GSM Rec 04.08), that cell shall be used, otherwise a cell in a new location area shall be used. However, before camping on the cell, the BCCH data for that cell shall be checked.

{The received level measurements on surrounding cells made during the last 5 seconds on the TCH or SDCCH may be averaged and used, where possible, to speed up the process. However, it should be noted that the received level monitoring while on the TCH or SDCCH is on carriers in BA (SACCH), while the carriers to be monitored for cell reselection are in BA (BCCH).}

Thereafter the MS shall perform cell reselection as specified in section 6.6

{The MS design should allow for the finite time that the cell reselection task takes. For example the user may want to originate a new call very soon after the end of a previous call, and the MS design should make this possible, e.g. by storing the origination until a cell has been selected.}

6.7.2 Call Reestablishment

In the event of a radio link failure, call re-establishment may be attempted (according to the algorithm in GSM Rec 04.08). The MS shall perform the following algorithm to determine which cell to use for the call re-establishment attempt.

(i) The received level measurement samples taken on surrounding cells and on the serving cell BCCH carrier in the last 5 seconds shall be averaged, and the carrier with the highest average received level which is part of a permitted PLMN (see section 7.2) shall be taken.

(ii) A BCCH data block containing the parameters affecting cell selection shall be read on this carrier.

(iii) If the parameter C1 is greater than zero, it is part of the selected PLMN, the cell is not barred, and call re-establishment is allowed, call re-establishment shall be attempted on this cell.

(iv) If the conditions in (iii) are not met, the carrier with the next highest average received level shall be taken, and the MS shall repeat steps (ii) and (iii) above.

(v) If the cells with the 6 strongest average received level values have been tried but cannot be used, the call re-establishment attempt shall be abandoned, and the algorithm of section 6.7.1 shall be performed.

6.8 Abnormal Cases and Emergency Calls

The MS shall perform the algorithm in this section if one of the following conditions exists:

(i) There is no SIM.

(ii) The MS cannot find a suitable cell of the selected PLMN to camp on.

(iii) The MS receives a "PLMN not allowed", "IMSI unknown" or illegal MS" response from the network.

Some of the following tasks shall be performed, depending on the conditions, as given in the Table below:

(a) The MS shall continually monitor the signal strength of all ~~124~~374 DCS 1800~~GSM~~ RF channels, and search for a BCCH carrier which has C1 >0 and which is not barred. When such a carrier is found, the MS shall camp on that cell, irrespective of the PLMN identity.

(b) The MS shall search the ~~30~~40 strongest DCS 1800~~GSM~~ RF channels to determine which PLMN's are available. This information shall be processed according to the PLMN selection algorithm defined in GSM recommendation 02.11.

(c) The MS shall perform cell reselection at least among the cells of the PLMN of the cell on which the MS has camped, according to the algorithm of section 6.6, except that a zero value of CELL_RESELECT_HYSTERESIS shall be used, and location updating shall not be performed.

Condition			Tasks to be performed as a minimum:		
SIM Present	Other	MS camped on a cell	(a)	(b)	(c)
X	X	No	Yes	No	No
No	X	Yes	No	No	Yes
Yes	"IMSI Unknown" "illegal MS"	Yes	No	No	Yes
Yes	No suitable cell of selected PLMN or PLMN not allowed	Yes	No	Yes	Yes

X = "Don't care state"

In this mode, only emergency calls may be made (and these may only made if task (c) was being performed). Powering down of the MS is permitted.

The MS shall leave this mode of operation and perform the cell selection algorithm (section 6.2 or 6.3) when either:

(i) A new PLMN is selected by the user (or other means within the MS)

(ii) The selected PLMN becomes available

(iii) The SIM is inserted.

9. CONTROL PARAMETERS :

The parameters employed to control the radio links are shown in Tables 1 and 2.

PARAMETER NAME	DESCRIPTION	RANGE	BITS	CHANNEL
BSIC	Base station Identification Code	0-63	6	SCH D/L
BA	BCCH Allocation.	-	~~124~~ =	BCCH D/L
BA_IND	Sequence number of BA	0/1	1	BCCH D/L
MS_TXPWR_MAX_CCH	The maximum TX power level an MS may use when accessing the system until otherwise commanded. (Coded the same as TXPWR).	0/31	5	BCCH D/L
RXLEV_ACCESS_MIN	Minimum received level at the MS required for access to the system.	0-63	6	BCCH D/L
RADIO_LINK_TIMEOUT	The maximum value of the radio link counter 4-64 SACCH blocks, 15 steps of 4 SACCH blocks	-	4	BCCH D/L
CELL_RESELECT_ HYSTERESIS	RXLEV hysteresis for required cell re-selection. 0-14dB, 2 db steps, i.e. 0=0dB, 1=2dB, etc.	0-7	3	BCCH D/L
PLMN_PERMITTED	Bit map of PLMNs for which the MS is permitted to report measurement results. Bit map relates to PLMN part of BSIC.	-	8	BCCH D/L
CELL_BAR_ACCESS	Bars all initial accesses to a cell. MS will not camp on a cell when set (1 = barred).	0/1	1	BCCH D/L

TABLE 1: RADIO SUB-SYSTEM LINK CONTROL PARAMETERS

PARAMETER NAME	DESCRIPTION	RANGE	BITS	MESSAGE
MS_TXPWR_REQUEST	The TX power to be used by an MS on TCH. downlink	0-31	5	L1 header
MS_TXPWR_CONF.	Confirmation of the TX power level in use by the MS. uplink	0-31	5	L1 header
RXLEV_FULL_ SERVING_CELL	The RXLEV in the current serving cell accessed over all TDMA frames	0-63	6	Measurement results
RXLEV_SUB_ SERVING_CELL	The RXLEV in the current serving cell accessed over a subset of TDMA frames	0-63	6	Measurement results
RXQUAL_FULL_ SERVING_CELL	The RXQUAL in the current serving cell, assessed over all TDMA frames.	0-7	3	Measurement results
RXQUAL_SUB_ SERVING_CELL	The RXQUAL in the current serving a cell, assessed over subset of TDMA frames.	0-7	3	Measurement results
DTX_USED	Indicates whether or not the MS used DTX during the previous measurement period.	-	1	Measurement results
BA_USED	Value of BA_IND for BCCH allocation used	0/1	1	Measurement results
RXLEV_NCELL_ (1-6)	The RXLEV assessed on BCCH carrier as indicated in the BCCH Allocation	0-63	6	Measurement
BCCH_FREQ_NCELL_ (1-6)	The BCCH carrier RF channel number in NCELL.	0-31	5	Measurement results
BSIC_NCELL_(1-6)	Base station identification code for NCELL.	0-63	6	Measurement results

TABLE 2: HANDOVER AND POWER CONTROL PARAMETERS - SLOW ACCH

Notes : 1) RXLEV and RXQUAL fields are coded as described in section 8.

2) BCCH_FREQ_NCELL_(1-6) is coded in accordance with GSM 04.08 ~~relation to the BCCH Allocation (BA) bit map as follows:~~

~~RF channel freq : 000 001 002 003 004 . . . 123 124~~
~~BCCH Allocation : 0 1 1 0 1 . . . 0 1~~
~~BCCH_FREQ_NCELL : 0 1 2 . . . 31 (max)~~

as the position in the list of BA carriers which is arranged in increasing numerical order according to the absolute RF channel number. The lowest position is coded 0.

3) This overall coding requires 115 bits to report measurements from the serving cell and 6 surrounding cells in the. Measurement Results message.

i.e. RXLEV_SERVING_CELL	6 bits)	
RXQUAL_FULL_SERVING_CELL	3 bits)	= 13 bits
RXQUAL_SUB_SERVING_CELL	3 bits)	
DTX_USED	1 bit)	
RXLEV_NCELL_(1-6)	6 bits)	
BCCH_FREQ_NCELL(1-6)	5 bits)	x 6 = 102 bits
BSIC_NCELL_(1-6)	6 bits)	

APPENDIX A:

DEFINITION OF A BASIC DCS 1800~~GSM~~ HAND-OVER AND RF POWER CONTROL ALGORITHM

1) Scope

This appendix specifies a basic overall handover algorithm and RF power control process that may be implemented in the GSM system.

The specification includes a set of algorithms that are sufficient to allow the successful implementation of an initial GSM system, and from which more complex algorithms may be developed.

The basic solution is not mandatory for network operators.

2) Functional Requirement

The present algorithm is based on the following assumptions :

- Single cell BSS
- The necessity to make a hand-over according to radio criteria is recognised in the BSS. It can lead to either an (internal) intracell hand-over or an intercell hand-over.
- Evaluation of a preferred list of target cells is performed in the BSS.
- Cell allocation is done in the MSC.
- Intracell hand-over for radio criteria (interference problems) may be performed directly by the BSS.
- The necessity to make a hand-over because of traffic reason (network directed hand-over) is recognised by the MSC and it is performed by sending a "hand-over candidate enquiry message" to BSS.
- The RF power control algorithm shall be implemented in order to optimise the RF power output from the MS (and BS if power control is implemented) ensuring at the same time that the level received at the BS (MS) is sufficient to keep adequate speech/data quality.
- All parameters controlling the hand-over and power control processes shall be administered on a cell by cell basis by means of O&M. The overall hand-over and power control process is split into the following stages :

i) BSS preprocessing and threshold comparisons.
ii) BSS decision algorithm.
iii) MSC cell allocation algorithm.

A BSS decision algorithm is specified such that the BSS can fulfil the mandatory requirement of being able to produce a preferred list of target cells for handover.

MS_RANGE_MAX : Threshold for the maximum permitted distance between MS and current BS. Range (2, 35 Km); step size 1.0 Km.

RXLEV_UL_IH : RXLEV threshold on uplink for intracell (interference) hand-over. Typical range -85 to - 40 dBm.

RXLEV_DL_IH : RXLEV threshold on downlink for intracell (interference) hand-over; typical range -85 to -40dBm

RXLEV_MIN(n) : Minimum RXLEV required for an MS to be allowed to handover to cell "n".

RXLEV_MIN_DEF : Default value of RXLEV_MIN, used to evaluate handover to undefined adjacent cells.

HO_MARGIN(n) : A parameter used in order to prevent repetitive hand-over between adjacent cells. It may be also used as a threshold in the power budget process. Range (0,24 dB);step size 1 dB.

HO_MARGIN_DEF : Default value of HO_MARGIN, used to evaluate handover to undefined adjacent cells.

N_CELL list : List of allowable adjacent cells for handover. Range (0, 16).

MS_TXPWR_MAX : Maximum TXPWR a MS may use in the serving cell. Range (~~13, 43~~10,30 dBm); step size 2 dB.

MS_TXPWR_MAX(n): Maximum TXPWR a MS may use in the adjacent cell "n". Range (~~13, 43~~10,30 dBm);step size 2dB.

MS_TXPWR_MAX_DEF: Default value of MS_TXPWR_MAX, used to evaluate handover to undefined adjacent cells.

BS_TXPWR_MAX : Maximum TXPWR used by the BS.

O .X5 : Boundary limits of five interference bands for the unallocated time slots. Typical range -115 to -85 dBm. (See Rec. 08.08)

Hreqave : RXLEV, RXQUAL and MS_BS Distance averaging periods defined in terms of number of SACCH multiframes. Range (1, 31); step size 1. (See Rec. 08.08)

Hreqt : The number of averaged results that can be sent in a "hand-over required message" from BSS to MSC. Range (1, 31); step size 1. (See Rec. 08.08)

Intave : Interference averaging period defined in terms of the number of SACCH multiframes. Range (1, 31); step size 1