TSG-RAN Meeting #10 ***RP-000576***
Bangkok, Thailand, 6 - 8 December 2000

Title: **Agreed CRs to TR 25.922**

Source: **TSG-RAN WG2**

Agenda item: **5.2.3**

Doc-1st-	Status-	Spec	CR	Rev	Subject	Cat	Version	Versio
R2-001968	agreed	25.922	008		PRACH/RACH configuration	F	3.3.0	3.4.0
R2-002120	agreed	25.922	009	1	Example of VCAM mapping rule	F	3.3.0	3.4.0
R2-002130	agreed	25.922	010	1	Predefined configurations for R'99	F	3.3.0	3.4.0
R2-002434	agreed	25.922	011		Utilisation of compressed mode for BSIC reconfirmation	F	3.3.0	3.4.0

3GPP RAN WG2#16
Beijing, PR China, 9 – 13 October, 2000

Document ***R2-001968***
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25.922	**CR**	**008**	Current Version:	3.3.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG-RAN #10	for approval	X	strategic		*(for SMG use only)*
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Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio	X	Core Network	

Source:	TSG-RAN WG2	**Date:**	2000-10-06
Subject:	PRACH/RACH configuration		
Work item:			

Category:	F	Correction	X	**Release:**	Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:	The means how to configure several Random Access channels in a cell in FDD mode were identified as unclear. This has lead to misunderstanding and some discussions between RAN2 and RAN3. This CR proposes a new section on examples of RACH/PRACH configurations in order to clarify the issues that have caused misunderstandings.
Clauses affected:	New Annex

Other specs affected:	Other 3G core specifications	X	→ List of CRs:	25.302 CR072, 25.331 CR 551
	Other GSM core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:	

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***** New section in the Annex *****

Annex H:
Examples of FDD RACH/PRACH Configuration

This appendix illustrates examples of RACH/PRACH configurations in a cell in FDD mode.

H.1 Principles of RACH/PRACH Configuration

In one cell, several RACHs and PRACHs may be configured by an operator, in order to meet the performance requirements in regard to the expected traffic volume. The model of RACH and PRACH described in TS 25.302 defines a one-to-one mapping between a certain RACH and a PRACH.

The RACHs mapped to the PRACHs may all employ the same Transport Format and Transport Format Combination Sets, respectively. It is however also possible that individual RACH Transport Format Sets are applied on each available RACH/PRACH. The parameters that define pairs of RACH and PRACH are specified in TS 25.331, in the information element “PRACH system information list”.

The “PRACH system information list” IE defines sets of “PRACH system information”, one for each pair of RACH and PRACH that shall be configured in a cell. The “PRACH system information list” IE is included in SIB 5 and SIB 6. The total number of configured RACH/PRACH pairs corresponds to the sum of PRACH system information multiplicity factors used in both SIB5 and SIB 6.

A PRACH could therefore be defined in a pragmatic way simply as a common uplink physical channel which is indicated in system information. It is straightforward for the UE to count the indicated RACH/PRACH pairs, perform a selection and configure itself for accessing the selected channel. There are however some restrictions on the choice of parameters to be included in PRACH system information. Restrictions are especially due to the requirement that the PRACH receiver in the Node B must be capable to identify unambiguously on which PRACH a random access is received. This is necessary to perform the mapping of the decoded PRACH message part to the correct RACH transport channel associated with the PRACH. For complexity reasons it is furthermore a desired feature that PRACH identification in FDD mode is completed in the preamble transmission phase in order to decode the PRACH message part which follows the preamble, as generally there might be different transport format parameters defined on each RACH.

Taking into account the above requirements, in FDD mode, the RACH/PRACH model allows to configure different PRACHs in the following two ways:

1.) For each PRACH indicated in system information a different preamble scrambling code is employed. For each PRACH, sets of “available signatures” and “available subchannel numbers” are defined in the “PRACH info (for RACH)” Information Element in TS 25.331. Any PRACH with an individual scrambling code may employ the complete or a subset of signatures and subchannels.

2.) Two (or more) PRACHs indicated in system information use a common preamble scrambling code. In this case each PRACH shall employ a distinct (non-overlapping) set of “available signatures” and “available subchannel numbers” in order to enable Node B to identify from the received random access signal which PRACH and respective RACH is used.

Figure H.1 shows examples of suitable FDD RACH/PRACH configurations for one cell. The upper part of the figure illustrates the one-to-one mapping between a RACH and a PRACH. Each RACH is specified via an individual Transport Format Set (TFS). The associated PRACH employs a Transport Format Combination Set (TFCS), with each TFC in the set corresponding to one specific TF of the RACH. The maximum number of PRACH per cell is currently limited to 16. The maximum number of RACHs must be the same due to the one-to-one correspondence between a RACH and a PRACH.

With each PRACH, a scrambling code is associated. TS 25.331 allows to address 16 different scrambling codes. Also, to each PRACH a set of "available subchannels" and "available signatures" is assigned.

For each PRACH a set of up to eight "PRACH partitions" can be defined for establishment of Access Service Classes (ASCs). A PRACH partition is defined as the complete or a subset of the "available signatures" and "available subchannel numbers" defined for one PRACH. An ASC consists of a PRACH partition and a persistence value. PRACH partitions employed for ASC establishment may be overlapping (note that Figure H.1 only illustrates cases of non-overlapping.PRACH partitions).

PRACH 0 and PRACH 1 in Figure H.1 employ the full set of PRACH subchannels and preamble signatures and are identified by using different preamble scrambling codes.

PRACH 2 and PRACH 3 illustrate a configuration where a common scrambling code but distinct (non-overlapping) partitions of "available subchannels" and "available signatures" are assigned. This configuration may e.g. be appropriate for establishment of two RACH/PRACH pairs, one with 10 and the other with 20 ms TTI.

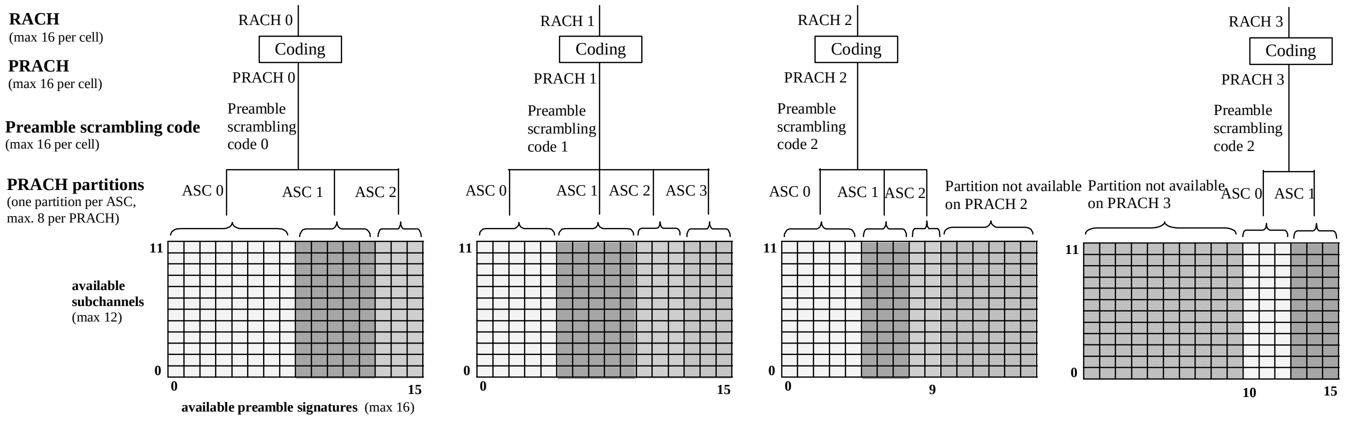

Figure H.1: Examples of FDD RACH/PRACH configurations in a cell

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Beijing, 9st – 13th October 2000

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25.922	**CR**	**009r1**	Current Version:	3.3.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

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Proposed change affects: (U)SIM [ ] ME [X] UTRAN / Radio [X] Core Network [ ]
(at least one should be marked with an X)

Source: TSG-RAN WG2 **Date:** 9/10/2000

Subject: Example of VCAM Mapping Rule

Work item:

Category:				**Release:**	
	F	Correction	X	Phase 2	
	A	Corresponds to a correction in an earlier release		Release 96	
(only one category	B	Addition of feature		Release 97	
shall be marked	C	Functional modification of feature		Release 98	
with an X)	D	Editorial modification		Release 99	X
				Release 00	

Reason for change: The example table of VCAM mapping rule in the TS 25.331 inserted for understanding of VCAM mode shall be moved to TR25.922.

Clauses affected: New Annex I

Other specs affected:				
	Other 3G core specifications		→ List of CRs:	
	Other GSM core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:

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Annex I: Example of PCPCH assignment with VCAM

This section illustrates an example of PCPCH assignment using the mapping rule specified in [9] for the Versatile Channel Assignment Method (VCAM) for the case that the number of PCPCHs, K, is larger than 16.

Table I-1 shows the mapping of pairs of AP signature/subchannel numbers and CA signature numbers to PCPCH indices k. In the shown example the number of minimum available spreading factors is set to R = 2, and the number of PCPCHs is K=21.

Table I-1: Example of PCPCH assignment with VCAM –

PCPCH (k)	A_0 = 128			A_1 = 256			
0	AP_0(AP0), CA_0	AP_2(AP1), CA_7	AP_1(AP2), CA_{14}	AP_0(AP3), CA_0	AP_1(AP4), CA_5	AP_2 (AP5), CA_{10}	AP_3(AP6), CA_{15}
1	AP_1(AP1), CA_0	AP_0(AP2), CA_7	AP_2(AP0), CA_{14}	AP_1(AP4), CA_0	AP_2(AP5), CA_5	AP_3(AP6), CA_{10}	
2	AP_2(AP2), CA_0	AP_1(AP0), CA_7	AP_0(AP1), CA_{14}	AP_2(AP5), CA_0	AP_3(AP6), CA_5	AP_0(AP3), CA_{11}	
3	AP_0(AP0), CA_1	AP_2(AP1), CA_8	AP_1(AP2), CA_{15}	AP_3(AP6), CA_0	AP_0(AP3), CA_6	AP_1(AP4), CA_{11}	
4	AP_1(AP1), CA_1	AP_0(AP2), CA_8	AP_2(AP0), CA_{15}	AP_0(AP3), CA_1	AP_1 (AP4), CA_6	AP_2(AP5), CA_{11}	
5	AP_2(AP2), CA_1	AP_1(AP0), CA_8	AP_0(AP1), CA_{15}	AP_1(AP4), CA_1	AP_2(AP5), CA_6	AP_3(AP6), CA_{11}	
6	AP_0(AP0), CA_2	AP_2(AP1), CA_9		AP_2(AP5), CA_1	AP_3(AP6), CA_6	AP_0(AP3), CA_{12}	
7	AP_1(AP1), CA_2	AP_0(AP2), CA_9		AP_3(AP6), CA_1	AP_0(AP3), CA_7	AP_1(AP4), CA_{12}	
8	AP_2(AP2), CA_2	AP_1(AP0), CA_9		AP_0(AP3), CA_2	AP_1(AP4), CA_7	AP_2(AP5), CA_{12}	
9	AP_0(AP0), CA_3	AP_2(AP1), CA_{10}		AP_1(AP4), CA_2	AP_2(AP5), CA_7	AP_3(AP6), CA_{12}	
10	AP_1(AP1), CA_3	AP_0(AP2), CA_{10}		AP_2(AP5), CA_2	AP_3(AP6), CA_7	AP_0(AP3), CA_{13}	
11	AP_2(AP2), CA_3	AP_1(AP0), CA_{10}		AP_3(AP6), CA_2	AP_0(AP3), CA_8	AP_1(AP4), CA_{13}	
12	AP_0(AP0), CA_4	AP_2(AP1), CA_{11}		AP_0(AP3), CA_3	AP_1(AP4), CA_8	AP_2(AP5), CA_{13}	
13	AP_1(AP1), CA_4	AP_0(AP2), CA_{11}		AP_1(AP4), CA_3	AP_2(AP5), CA_8	AP_3(AP6), CA_{13}	
14	AP_2(AP2), CA_4	AP_1(AP0), CA_{11}		AP_2(AP5), CA_3	AP_3(AP6), CA_8	AP_0(AP3), CA_{14}	
15	AP_0(AP0), CA_5	AP_2(AP1), CA_{12}		AP_3(AP6), CA_3	AP_0(AP3), CA_9	AP_1(AP4), CA_{14}	
16	AP_1(AP1), CA_5	AP_0(AP2), CA_{12}		AP_0(AP3), CA_4	AP_1(AP4), CA_9	AP_2(AP5), CA_{14}	
17	AP_2(AP2), CA_5	AP_1(AP0), CA_{12}		AP_1(AP4), CA_4	AP_2(AP5), CA_9	AP_3(AP6), CA_{14}	
18	AP_0(AP0), CA_6	AP_2(AP1), CA_{13}		AP_2(AP5), CA_4	AP_3(AP6), CA_9	AP_0(AP3), CA_{15}	
19	AP_1(AP1), CA_6	AP_0(AP2), CA_{13}		AP_3(AP6), CA_4	AP_0(AP3), CA_{10}	AP_1(AP4), CA_{15}	
20	AP_2(AP2), CA_6	AP_1(AP0), CA_{13}		AP_0(AP3), CA_5	AP_1(AP4), CA_{10}	AP_2(AP5), CA_{15}	

NOTE:

- SF (A_0) = 128, Number of AP (S_0) = 3: Re-numbered AP0 = AP_0, AP1 = AP_1, AP2 = AP_2

- SF (A_1) = 256, Number of AP (S_1) = 4: Re-numbered AP3 = AP_0, AP4 = AP_1, AP5 = AP_2, AP6 = AP_3
- P_0=P_1=21
- T_0=T_1=16.
- In this example, M_0=7, M_1=21

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Beijing, China, Oct 9th-Oct 13th, 2000

Document ***R2-002125***

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25.922	**CR**	**010r1**	Current Version: 3.3.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

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Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from:* ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio	X	Core Network

Source: TSG-RAN WG2 **Date:** 2000-10-13

Subject: Predefined configurations for R99

Work item:

Category:				**Release:**	
	F	Correction	X	Phase 2	
	A	Corresponds to a correction in an earlier release		Release 96	
(only one category	B	Addition of feature		Release 97	
shall be marked	C	Functional modification of feature		Release 98	
with an X)	D	Editorial modification		Release 99	X
				Release 00	

Reason for change: So far no solution has been agreed for downloading pre- defined radio bearer configurations in GSM/ GPRS. The proposed changes are need because the handover to UTRAN procedures for R99 should not depend on the support of downloading these configurations within GSM. This CR updates the description of the handover to UTRAN procedure to reflect the current status of the discussions in R2.

Clauses affected: 5.1.5.2.2, 5.1.5.2.5

Other specs affected:			
	Other 3G core specifications		→ List of CRs:
	Other GSM core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments:

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5.1.5.2.2 Predefined radio configuration information

In order to reduce the size of certain size critical messages in UMTS, a network may download/ pre- define one or more radio configurations in a mobile. A predefined radio configuration mainly consists of radio bearer- and transport channel parameters. A network knowing that the UE has suitable predefined configurations stored can then refer to the stored configuration requiring only additional parameters to be transferred.

Predefined configurations may be applied when performing handover from another RAT to UTRAN. In the case of handover from GSM to UTRAN, the performance of handover to UTRAN is improved when it is possible to transfer the handover to UTRAN command within a non-segmented GSM air interface message.

Furthermore, it is important to note that it is a network option whether or not to use pre-configuration; the handover to UTRAN procedures also support transfer of a handover to UTRAN command including all parameters.

NOTE: In case segmentation is used, subsequent segments can only be transferred after acknowledgement of earlier transmitted segments. In case of handover however, the quality of the UL may be quite poor resulting in a failure to transfer acknowledgements. This implies that it may be impossible to quickly transfer a segmented handover message. Segmentation over more than two GSM air interface messages will have a significantly detrimental, and unacceptable, impact on handover performance.

The UE shall be able to store upto 16 different predefined configurations, each of which is identified with a separate pre-configuration identity. The UE need not defer accessing the network until it has obtained all predefined configurations. The network may use different configurations for different services e.g. speech, circuit switched data. Moreover, different configurations may be needed because different UTRAN implementations may require service configurations to be customised e.g. different for micro and macro cells.

The predefined configurations stored within the UE are valid within the scope of a PLMN; the UE shall consider these configurations to be invalid upon PLMN re-selection. Furthermore, a value tag is associated with each individual pre-defined configuration. This value tag, that can have 16 values, is used by the UE and the network to ensure the stored pre-defined configuration(s) is the latest/required version. The UE erases all pre- defined configurations upon switch off.

Besides using pre- defined configurations, the use of default radio bearer configurations is considered. A default configuration is a set of radio bearer parameters for which the values are defined in the standard. While the network can configure the parameter values to be used in a predefined configuration in a flexible manner, the set of radio bearer parameter values for a default configuration are specified in the standard and hence fixed. The main use of default configurations is that they can be used at any time; they need not be downloaded into the UE. The use of default configurations is FFS.

The current facilities in 25.331 have focused on the use of predefined configurations during handover from GSM to UTRAN. The same principles may also be applied for the handover procedures used within UTRAN e.g. handover including SRNC relocation. Use of predefined configurations in these cases may require extension of the currently defined RRC procedures.

5.1.5.2.5 Handover to UTRAN information flows, typical example

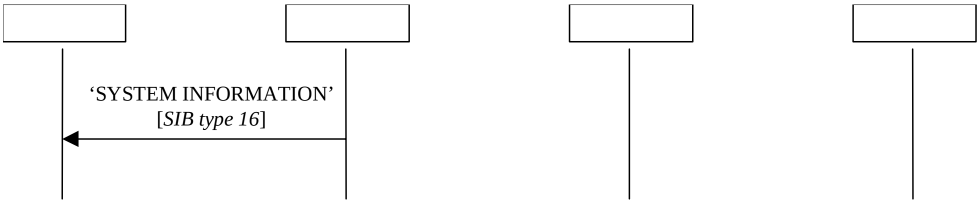
The handover to UTRAN procedure may include several subsequent information flows. The example described in this section is representative of a typical sequence of information flows. It should be noted that some procedures may actually be performed in parallel e.g. configuration of UTRA measurements and downloading of pre- defined configurations.

NOTE: Since work is ongoing in this area, the names of the information flows provided in the following diagrams may not reflect the latest status of standards/ CRs.

The description includes the different network nodes and interfaces involved in the handover to UTRAN procedure.

Flow 1: Downloading of predefined configuration information within UTRA

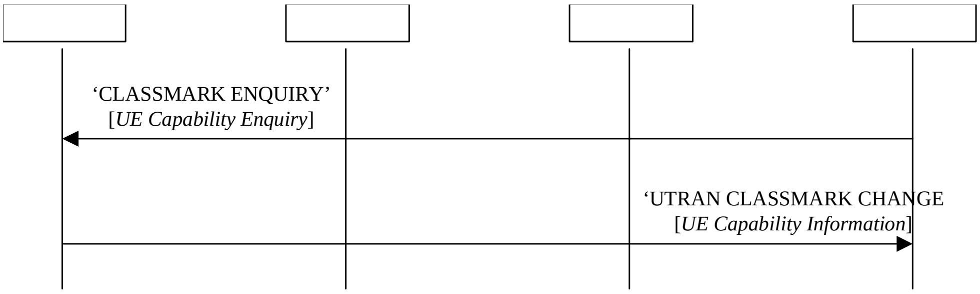
If the mobile uses UTRA prior to entering another RAT, it may download predefined configuration information as shown in the following diagram. UTRAN broadcasts predefined configuration information within the system information. The UE should read and store all the configurations broadcast by UTRAN. The configurations should be used when re- entering UTRAN.



In order to reduce the likelihood that a UE starts a call in GSM/ GPRS without having a valid pre-defined configuration stored, UE’s that do not have pre- defined configurations stored may temporarily prioritise UMTS cells.

Flow 2: UE capability, security and pre- defined configuration information exchange

In order to prepare for handover to UTRAN, the BSS may retrieve UE capability, security and pre- defined configuration status information by means of the sequence shown below. This procedure may not only be invoked upon initial entry of a mobile supporting UTRA within GSM, but also when the mobile continues roaming within the GSM network. It should be noted that, the mobile could also send the information automatically by means of the early classmark change procedure.



Furthermore, pre- defined configuration status information may be transferred to the BSS during handover from UTRAN.

The BSS has to store the received information until the handover to UTRAN is invoked.

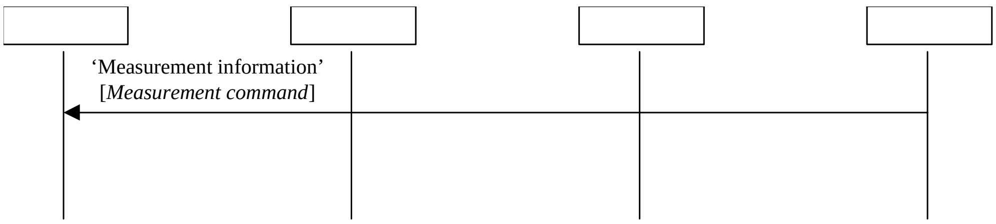
NOTE 1: During the handover procedure, the stored UE capability and security information is sent to the target RNC.

NOTE 2: Depending on the received predefined configuration status information, the BSS may need to invoke the procedure for downloading predefined configurations, as described in flow 4

Flow 3: Configuration of UTRA measurements

The BSS configures the UTRA measurements to be performed by the mobile, including the concerned thresholds and the reporting parameters, by means of the following information flow.

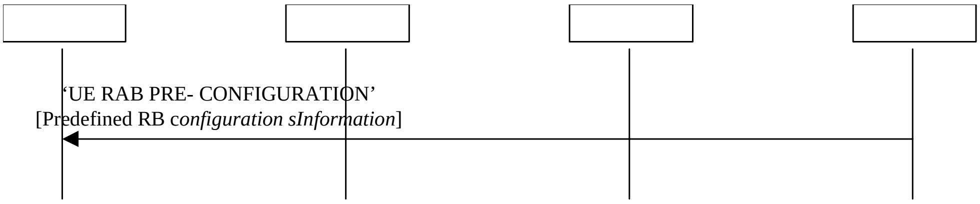
NOTE: The BSS may possibly decide the measurement configuration to be used based upon previously received UE capability information (e.g. supported modes & bands)



NOTE: The network may also provide information about neighbouring UTRAN cells within the CHANNEL RELEASE message.

Flow 4: Downloading of pre- defined radio bearer configurations within GSM

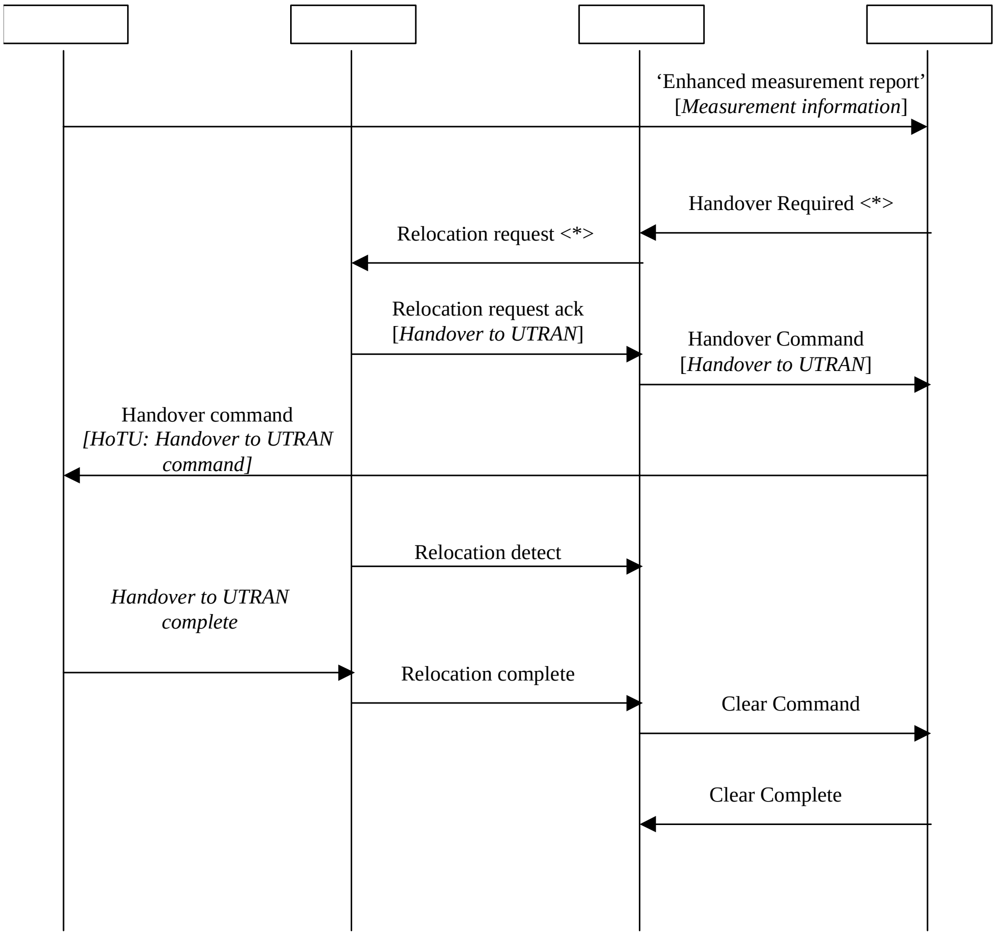
The pre-defined configuration status information (indicating which configurations are stored, as well as their value tags) is included in the UTRAN CLASSMARK CHANGE message This information may indicate that the UE does not have the required predefined configuration stored, in which case the BSS should initiate the transfer of these configurations by means of the information flow shown below.



The handover to UTRAN procedures for R99 should not rely on the support of the procedure for the downloading of pre- defined radio bearer configurations within GSM.

Flow 5: Handover

When the BSS decides that handover to UTRAN should be performed, triggered by the reception of a measurement report, it initiates the handover procedure. Next, the CN requests resources by sending a Relocation request to the target RNC. This message should include the UE capability and security information previously obtained by the BSS. The pre- defined configuration status information should be included in the Relocation request also. The main reason for this it that when selecting the predefined configuration to be indicated within the handover to UTRAN command message, the target RNC should know if the UE has downloaded all predefined configurations or only a subset.



The relocation request includes an indication of the service type for which the handover is requested. This information is used by the target RNC to select the predefined configuration to be used by the UE, which is included within the handover to UTRAN command.

In case no (suitable) predefined configuration is stored within the UE, the network may either completely specify all radio bearer, transport channel and physical channel paremeters or apply a default configuration (FFS).

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⌘ **25.922**	**CR 011**	⌘ rev	**-**	⌘ Current version:	**3.3.0**	⌘

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Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [X] Core Network [ ]

Title:	⌘ Utilisation of compressed mode for BSIC reconfirmation		
Source:	⌘ TSG-RAN WG2		
Work item code:	⌘	***Date:*** ⌘	2000-11-17
Category:	⌘ **F**	***Release:*** ⌘	R99
	Use one of the following categories: ***F*** *(essential correction)* ***A*** *(corresponds to a correction in an earlier release)* ***B*** *(Addition of feature),* ***C*** *(Functional modification of feature)* ***D*** *(Editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.	*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*	

Reason for change: ⌘	Reflect the conclusion of the joint RAN2/RAN4 ad hoc in the description of compressed mode parameterisation FDD inter-frequency and GSM measurements.
Summary of change: ⌘	This CR reflects the changes that have been brought to the parameterisation of compressed mode by RAN4 i.e. the amount of measurement the UE is able to perform depending on the compressed mode parameters. For GSM measurements this CR captures the 2 approaches adopted jointly by RAN2 and RAN4 for the BSIC reconfirmation.
Consequences if not approved: ⌘	The updated version of the TR is intended to serve as a common reference for RAN2 and RAN4 to implement the necessary changes in their respective specifications (25.331 and 25.133) to support GSM measurements and define the corresponding requirements on the UE. The current description does not reflect the content of the RAN2 and RAN4 specifications.

Clauses affected: ⌘	5.1.6.1, 5.1.6.2.1, 5.1.6.2.1.1, 5.1.6.2.1.2, 5.1.6.2.3, 5.1.6.2.3.1, 5.1.6.2.3.2, 5.1.6.2.3.3, 5.1.6.2.3.3.1, 5.1.6.2.3.3.2, 5.1.6.2.3.4, 5.1.6.2.3.5	
Other specs affected: ⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘
Other comments: ⌘	It was concluded in the joint RAN2 and RAN4 RRM meeting that 25.922 should capture the conclusions	

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Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.1.6 Measurements for Handover

5.1.6.1 Monitoring of FDD cells on the same frequency

The UE shall be able to perform intra-frequency measurements simultaneously for data reception from the active set cell/s. If one or several compressed mode pattern sequences are activated, intra frequency measurements can be performed between the transmission gaps. During the measurement process of cells on the same frequencies, the UE shall find the necessary synchronisation to the cells to measure using the primary and secondary synchronisation channels and also the knowledge of the possible scrambling codes in use by the neighbouring cells.

The number of intra-frequency cells which the UE is able to measure and report to the UTRAN depends on the amount of time available to perform these measurements i.e. the time left by the activation of all compressed mode pattern sequences the UTRAN may activate is able to support depending on its capability (FDD, TDD, GSM). The rules to derive the number of cells which can be reported by the UE depending on the characteristics of the activated compressed mode patterns are given in 25.133.

5.1.6.2 Monitoring cells on different frequencies

5.1.6.2.1 Monitoring of FDD cells on a different frequency

Upper layers may ask FDD UE to perform preparation of inter-frequency handover to FDD. In such case, the UTRAN signals to the UE the ~~handover monitoring set~~neighbour cell list~~,~~ and if needed, the compressed mode parameters used to make the needed measurements. Setting of the compressed mode parameters defined in [3] for the preparation of handover from UTRA FDD to UTRA FDD is indicated in the following section. ~~The compressed mode for IFHO preparation from UTRA-FDD to UTRA-FDD has two different modes. One is "selection-mode". The UE must identify the cell during this mode. The other is "reselection-mode". The UE measures signal strength by the scrambling code already known. Selection mode / reselection mode parameter sets are described in section 5.6.1.2.1.1/5.6.1.2.1.2 respectively.~~

Measurements to be performed by the physical layer are defined in [3].

5.1.6.2.1.1 Setting of parameters for transmission gap pattern sequence with purpose “FDD” measurements ~~the compressed mode parameters for selection mode~~

During the transmission gaps, the UE shall perform measurements so as to be able to report to the UTRAN the frame timing, the scrambling code and the Ec/Io of Primary CCPCH of up FDD cells in the ~~handover monitoring set~~neighbour cell list.

~~When compressed mode is used for cell acquisition at each target FDD frequency, the parameters of compressed mode pattern are fixed to be:~~

	~~TGL~~	~~TGD~~	~~TGP1~~	~~TGP2~~	~~PD~~
~~Pattern1~~	~~7~~	~~24/15~~	~~4~~	~~20~~	~~M~~
~~Pattern2~~	~~7~~	~~24/15~~	~~4~~	~~140~~	~~M~~
~~Pattern3~~	~~7~~	~~2~~	~~4~~	~~Not Used~~	~~M~~
~~Pattern4~~	~~7~~	~~2~~	~~4~~	~~20~~	~~M~~
~~Pattern5~~	~~7~~	~~2~~	~~4~~	~~140~~	~~M~~
~~Pattern6~~	~~14~~	~~3~~	~~6~~	~~18~~	~~M~~
~~Pattern7~~	~~14~~	~~3~~	~~6~~	~~138~~	~~M~~

When requiring the UE to monitor inter-frequency FDD cells, the UTRAN may use any transmission gap pattern sequence with transmission gaps of length 5, 7, 10 and 14 slots.

The time needed by the UE to perform the required inter-frequency measurements according to what has been requested by the UTRAN depends on the transmission gap pattern sequence characteristics such as e.g. TGD, TGPL and TGPRC. The rules to derive these measurement times are given in 25.133.

~~NOTE: The frequency switching time required for UE is assumed to be 666us (equal to the slot duration) which includes implementation margin. This assumption means UE will consume 1slot of TGL for frequency switching (go and return) time.~~

~~5.1.6.2.1.2 Setting of the compressed mode parameters for reselection mode~~

~~This parameter sets are used for UE which already know the downlink scrambling code. UTRAN indicate which pattern will be used by UE. According to the result during reselection mode, If needed, UTRAN will indicate the transition back to the selection mode.~~

	~~TGL~~	~~TGD~~	~~TGP1~~	~~TGP2~~	~~PD~~
~~Pattern8~~	~~7~~	~~0~~	~~72~~	~~Not Used~~	~~M~~
~~Pattern9~~	~~7~~	~~0~~	~~144~~	~~Not Used~~	~~M~~

5.1.6.2.2 Monitoring of TDD cells

Upper layers may ask dual mode FDD/TDD UE to perform preparation of inter-frequency handover to TDD. In such case, the UTRAN signals to the UE the handover monitoring set, and if needed, the compressed mode parameters used to make the needed measurements. Setting of the compressed mode parameters defined in [3] for the preparation of handover from UTRA FDD to UTRA TDD is indicated in the following section. Measurements to be performed by the physical layer are defined in section 5.

5.1.6.2.2.1 Setting of the compressed mode parameters

When compressed mode is used for cell acquisition at each target TDD frequency, the parameters of compressed mode pattern are fixed to be:

TGL	TGD	TGP	PD

NOTE: settings for cell acquisition are FFS.

5.1.6.2.2.2 Setting of compressed mode parameters with prior timing information between FDD serving cell and TDD target cells

When UTRAN or UE have this prior timing information, the compressed mode shall be scheduled by upper layers with the intention that SCH on the specific TDD base station can be decoded at the UE during the transmission gap.

TGL	SFN	SN
4	(calculated by UTRAN)	(calculated by UTRAN)

5.1.6.2.3 Monitoring of GSM cells

Upper layers may ask a dual ~~mode~~RAT FDD/GSM UE to perform preparation of inter-frequency handover to GSM. In such case, the UTRAN signals to the UE the ~~handover monitoring set~~neighbour cell list~~,~~ and, if needed, the compressed mode parameters used to make the needed measurements.

The involved measurements are covered by 3 measurement purposes "GSM ~~BCCH power~~RSSI" ~~measurements~~ (Section 5.1.6.2.3.1), "GSM BSIC identification" (Section 5.1.6.2.3.2) and " GSM BSIC reconfirmation" (Section 5.1.6.2.3.3).~~initial GSM SCH or FCCH acquisition (Section 5.1.6.2.3.2), acquisition/tracking of GSM SCH or FCCH when timing information between UTRA serving cells and the target GSM cell is available (Section 5.1.6.2.3.3), and BSIC reconfirmation (Section 5.1.6.2.3.4).~~ A different transmission gap pattern sequence is supplied for each measurement purpose. This implies that when the UE is monitoring GSM, up to 3 transmission gap pattern sequences can be activated by the UTRAN.

5.1.6.2.3.1 Setting of parameters for transmission gap pattern sequence ~~compressed mode parameters for Power measurements~~ with purpose "GSM RSSI"

When compressed mode is used for GSM ~~BCCH power~~RSSI measurements, ~~the parameters~~any transmission gap pattern sequence can be used which contains transmission gap of lengths 3, 4, 7, 10 or 14 slots. ~~of compressed mode pattern are fixed to be:~~

Pattern No.	TGL	TGD	TGP	PD
1	3	0	8	128

Pattern 1 allows measuring all the adjacent cell signal levels even with the maximum of 32 frequencies, if two measurements are done during each transmission gap. The pattern can be repeated by sending the measurement request again, if more measurement data is desired.

In order to fulfil the expected GSM power measurements requirement, the UE can get effective measurements samples during a time window of length Tmeas, equal to the transmission gap length reduced by an implementation margin of [2*500 µs + 200 µs], which that includes the maximum allowed delay for a UE's synthesiser to switch from one FDD frequency to one GSM frequency and switch back to FDD frequency, plus some additional implementation margin.

The number of samples that can be taken by the UE during the allowed transmission gap lengths and their distribution over the possible GSM frequencies is given in 25.133.

5.1.6.2.3.2 Setting of parameters for compressed mode parameters transmission gap pattern sequence with purpose "GSM initial BSIC identification" for first SCH decoding without prior knowledge of timing information

The setting of the compressed mode parameters is described in this section when used for first SCH decoding of one cell when there is no knowledge about the relative timing between the current FDD cells and the neighbouring GSM cell.

On upper layers command, UE shall pre-synchronise to the each of GSM cells in the handover monitoring set and decode their BSIC [GSM 05-series].

The table below gives a set of reference transmission pattern gap sequences that might be When compressed mode is used to perform BSIC identification i.e. initial FCCH/SCH acquisition, the compressed mode pattern belongs to the list of patterns in table..

The time available to the UE to perform In order to fulfil the expected GSM SCH speed BSIC identification requirement, the UE can get effective measurements samples during a time window of length Tmeas, is equal to the transmission gap length reduced byminus an implementation margin of [2*500 µs + 200 µs], that includes the maximum allowed delay for a UE's synthesiser to switch from one FDD frequency to one GSM frequency and switch back to FDD frequency, , the UL/DL timing offset, and the inclusion of the pilot field in the last slot of the transmission gap for the case of downlink compressed mode. plus some additional implementation margin.

	TGL	TGD	TGP	PD parallel search / serial search
Pattern 1	7	0	2	40/64
Pattern 2	7	0	3	39/63
Pattern 3	7	2	9	63/252
Pattern 4	7	3	12	99/123
Pattern 5	14	0	2	12/26
Pattern 6	14	2	6	24/48
Pattern 7	14	2	8	34/58
Pattern 8	14	2	12	60/84
Pattern 9	10	12	48	108/828
Pattern 10	10	0	48	240/1440

	TGL1 [slots]	TGL2 [slots]	TGD [slots]	TGPL1 [frames]	TGPL2 [frames]	$T_{identify\ abort}$ [s]	$N_{identify\ abort}$ [patterns]
Pattern 1	7	0	0	3	0	1.53	51
Pattern 2	7	0	0	8	0	5.20	65
Pattern 3	7	7	47	8	0	2.00	25
Pattern 4	7	7	38	12	0	2.88	24
Pattern 5	14	0	0	8	0	1.76	22
Pattern 6	14	0	0	24	0	5.04	21
Pattern 7	14	14	45	12	0	1.44	12
Pattern 8	10	0	0	12	0	2.76	23
Pattern 9	10	10	75	12	0	1.56	13
Pattern 10	8	0	0	8	0	2.80	35
Pattern 11	8	0	0	4	0	1.52	38

The pattern duration for the parallel search (time until a GSM FCCH or SCH burst is found) and for the serial search (time until a FCCH burst is found) is given.

The patterns 5…8 should mainly be used in such cases where the present signal level suddenly drops and very little time to execute the handover is available. Patterns 1…4 are significantly more optimal from the point of view of the transmission power control than the other ones, while patterns 5…8 consume less slots for the measurements on the average.

Patterns 1…4 may use any pattern described in [2]. Patterns 5…10 must use the double frame method.

The patterns 9 and 10 are optimised for least consumption of slots for the measurements on the average using the parallel search. The patterns 9 and 10 achieve about the same or half the speed of the synchronisation to GSM from GSM.

For the above listed compressed mode patterns sequences, $N_{identify\ abort}$ indicates the maximum number of patterns from the transmission gap pattern sequence which may be devoted by the UE to the identification of the BSIC of a given cell. $T_{identify\ abort}$ times have been derived assuming the serial search and two SCH decoding attempts since the parallel search is not a requirement for the UE.

Each pattern corresponds to a different compromise between speed of GSM SCH search and rate of use of compressed frames. On upper layers command, the repetition of the selected pattern can be stopped and/or replaced by one of the other listed patterns. Upper layers may also decide to alternate the use of different patterns periods.

Requirements are set in 25.133 to ensure a proper behaviour of the UE depending on the signalled parameters.

Depending on the UE's capabilities, the search procedure may be sequential (tracking of FCCH burst before decoding of the first SCH) or parallel (parallel tracking of FCCH and SCH bursts). The latter solution achieves SCH decoding faster than the first one, thus decreasing the needed number of repeated patterns.

Once the UE has completed the search it signals the UTRAN with FCCH-found or SCH-found, both with the timing of the associated SCH burst, or with FCCH/SCH-not-found [GSM 05-series].

In case of FCCH-found, the UTRAN can continue the current pattern until also SCH is found or stop it and schedule a single, properly aligned gap for SCH search as described in 5.1.6.2.3.3.

Whenever UE receives a new neighbour cell with a sufficiently high power level [GSM 05-series], it shall perform a new SCH search procedure.

When a compressed mode pattern is available, then it is up to the UE to trigger this search procedure with the available transmission gaps. In this case, no specific signalling is needed between the UE and the UTRAN.

When a compressed mode pattern is not available, the UE shall initiate the search procedure by sending a "request new cell search" message to the UTRAN. Based on the UE's capabilities for serial or parallel search as described above, the UTRAN then determines a suitable compressed mode pattern and signals this to the UE. The upper layers can delay the onset of this pattern depending on the timing priority the Network Operator has set for new BSIC identification.

5.1.6.2.3.3 Setting of parameters ~~compressed mo~~for transmission gap pattern sequence ~~de parameters~~ with purpose "GSM BSIC reconfirmation".~~for first SCH decoding with prior timing information between UTRAN serving cells and GSM target cells~~

BSIC reconfirmation is performed by the UE using a separate compressed mode pattern sequence (either the same as for BSIC identification or a different one). When the UE starts BSIC reconfirmation for one cell using the compressed mode pattern sequence signalled by the UTRAN, it has already performed at least one decoding of the BSIC (during the initial BSIC identification).

UTRAN may have some available information on the relative timing between GSM and UTRAN cells. Two alternatives are considered for the scheduling of the compressed mode pattern sequence by the UTRAN for BSIC reconfirmation depending on whether or not UTRAN uses the timing information provided by the UE.

The requirements on BSIC reconfirmation are set in 25.133 independently of how the transmission gap pattern sequence are scheduled by the UTRAN. These requirements apply when the GSM SCH falls within the transmission gap of the transmission gap pattern sequence with a certain accuracy. The UTRAN may request the UE to re-confirm several BSICs within a given transmission gap.

~~UTRAN or UE may have some prior knowledge of timing difference between some FDD cells in UE's active set and some GSM cells in the handover monitoring set. When this information is acquired by the UE (e.g. after initial FCCH/SCH detection) and on upper layers command, the UE shall report it to the upper layers for verification of UTRAN's information, and feedback of this information from UTRAN to the other UE.~~

The UTRAN may use any transmission gap pattern sequence with transmission gap length 5, 7, 8, 10 or 14 slots for BSIC reconfirmation. For the following reference transmission gap pattern sequences, $T_{re\text{-}confirm\_abort}$ indicates the maximum time allowed for the re-confirmation of the BSIC of one GSM cell in the BSIC re-confirmation procedure, assuming a worst-case GSM timing. This parameter is signalled by the UTRAN to the UE with the compressed mode parameters.

	TGL1 [slots]	**TGL2** [slots]	**TGD** [slots]	**TGPL1** [frames]	**TGPL2** [frames]	$T_{re\text{-}confirm\_abort}$ [s]	$N_{re\text{-}confirm\_abort}$ [patterns]
Pattern 1	7	0	0	3	0	1.29	43
Pattern 2	7	0	0	8	0	4.96	62
Pattern 3	7	0	0	15	0	7.95	53
Pattern 4	7	7	69	23	0	9.89	43
Pattern 5	7	7	69	8	0	2.64	33
Pattern 6	14	0	0	8	0	1.52	19
Pattern 7	14	14	60	8	0	0.80	10
Pattern 8	10	0	0	8	0	1.76	22
Pattern 9	10	0	0	24	0	4.80	20
Pattern 10	8	0	0	8	0	2.56	32
Pattern 11	8	0	0	23	0	7.82	34
Pattern 12	7	7	47	8	0	1.76	22
Pattern 13	7	7	38	12	0	2.64	22
Pattern 14	14	0	0	24	0	4.80	20
Pattern 15	14	14	45	12	0	1.20	10
Pattern 16	10	0	0	12	0	2.52	21
Pattern 17	10	10	75	12	0	1.32	11
Pattern 18	8	0	0	4	0	1.28	32

NOTE: it is to be decided within RAN WG4 whether 18 patterns should be kept for BSIC reconfirmation.

5.1.6.2.3.3.1 Asynchronous BSIC reconfirmation

In this case, the UTRAN provides a transmission gap pattern sequence without using information on the relative timing between UTRAN and GSM cells.

The way the UE should use the compressed mode pattern for each cell in case the BSIC reconfirmation is required for several cells is configured by the UTRAN using the $N_{re\text{-}confirm\_abort}$ parameter which is signalled with the transmission gap pattern sequence parameters. Requirements are set in 25.133 to ensure a proper behaviour of the UE depending on the signalled parameters.

5.1.6.2.3.3.2 Synchronous BSIC reconfirmation

When UTRAN or UE _hasve this prior timing information, the compressed mode shall can be scheduled by upper layers with the intention that SCH(s) (or FCCH(s) if needed) ofn aone or several specific GSM cells band can be decoded at the UE during the transmission gap(s). i.e. the transmission gap(s) are positioned so that the SCH(s) of the target GSM cell(s) are in the middle of the effective measurement gap period(s). Which BSIC is to be reconfirmed within each gap is not explicitly signalled, but determined by the UE based on prior GSM timing measurements

The transmission gap parameters used for GSM FCCH/SCH tracking with prior timing information are:

TGL	SFN	SN
4	(calculated by UTRAN)	(calculated by UTRAN)

In addition to normal compressed mode parameters, UTRAN signals the following information to the UE:

- The GSM carrier for which the particular compressed frame is intended (BS ID, carrier no, etc.)

Once the UE has completed the search, it signals the UTRAN with the timing of the associated SCH burst or with SCH-not-found.

5.1.6.2.3.4Setting of compressed mode parameters for SCH decoding for BSIC reconfirmation and procedure at the UE

In this paragraph it is assumed that the UE has successfully decoded one SCH burst of a given neighbouring GSM cell during the call.

When a compressed mode pattern is available, then it is up to the UE to trigger and perform the BSIC reconfirmation procedure with the available transmission gaps. In this case, no specific signalling is needed between the UE and the UTRAN for BSIC reconfirmation procedure.

When no compressed mode pattern is available then it is up to the UE to trigger and perform the BSIC reconfirmation procedure. In that case, UE indicates to the upper layers the schedule of the SCH burst of that cell, and the size of the necessary transmission gap necessary to capture one SCH burst. The Network Operator decides the target time for BSIC reconfirmation and the upper layers uses this and the schedule indicated by the UE to determine the appropriate compressed mode parameters.

The compressed mode parameters shall be one of those described in [3].

5.1.6.2.3.5Parameterisation of the compressed mode for handover preparation to GSM

Whereas section 5.1.6.2.3.2 described the compressed mode parameterisation for the initial synchronisation tracking or reconfirmation for one cell and the compressed mode parameters for power measurement for one of multiple cells, there is a need to define the global compressed mode parameters when considering the monitoring of all GSM cells.