TSG-RAN WG1, Meeting #15 R1-00-1108
Berlin, Germany, 22-25 August, 2000

Agenda item:

Source: QUALCOMM Europe

Title: CR 25.215-073

Compressed mode in support of LCS related measurement

Document for: Decision

Assisted GPS is one of the positioning techniques approved for inclusion in R'99. It should therefore be fully supported by the physical layer specification together with other LCS techniques. However, the current text in 25.215 section 6.1.1 does not cover FDD compressed mode in support of LCS measurements in general and GPS measurements in particular when this technique is supported in the UE.

The corrections proposed in the attached CR to 25.215, together with the proposed change to TR 25.926 found in R1-00-1109 would ensure that LCS techniques are fully and efficiently supported within the R'99 framework.

If approved, this CR would supersede CR 25.215-069 (R1-00-0951) as it includes the changes proposed in that document.

3GPP TSG RAN WG1 #15
Berlin, Germany, 22-25 August 2000

Document R1-00-0000
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

25.215	**CR**	**073**	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 #9	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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:	QUALCOMM Europe		**Date:**	2000-08-21	
Subject:	Inclusion of compressed mode in support for LCS related measurement				
Work item:	R'99 LCS				

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

Reason for change:	Several positioning techniques have been approved for inclusion in R'99. However the current text does not cover FDD compressed mode in support of LCS related measurements.
Clauses affected:	6.1.1

Other specs affected:				
	Other 3G core specifications	X	→ List of CRs:	CR 25.926-xxx
	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:	The CR also corrects various editorial errors.

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6 Measurements for UTRA FDD

6.1 UE measurements

6.1.1 Compressed mode

6.1.1.1 Use of compressed mode/dual receiver for monitoring

A UE shall, on higher layers commands, monitor cells on other frequencies (FDD, TDD, GSM) or perform LCS related measurements. To allow the UE to perform measurements, higher layers shall command that the UE enters in compressed mode, depending on the UE capabilities.

In case of compressed mode decision, UTRAN shall communicate to the UE the parameters of the compressed mode.

A UE with a single receiver shall support downlink compressed mode.

Every UE shall support uplink compressed mode, when monitoring frequencies which are close to the uplink transmission frequency (i.e. frequencies in the TDD or GSM 1800/1900 bands).

All fixed-duplex UE shall support both downlink and uplink compressed mode to allow inter-frequency handover within FDD and inter-mode handover from FDD to TDD.

Monitoring frequencies outside TDD and GSM 1800/1900 bands without uplink compressed mode is a UE capability.

UE with dual receivers can perform independent measurements, with the use of a "monitoring branch" receiver, that can operate independently from the UTRA FDD receiver branch. Such UE do not need to support downlink compressed mode.

The UE shall support one single measurement purpose within one compressed mode transmission gap. The measurement purpose of the gap is signalled by higher layers.

The following subclause provides rules to ~~parametrise~~parameterise the compressed mode.

6.1.1.2 Parameterisation of the compressed mode

In response to a request from higher layers, the UTRAN shall signal to the UE the compressed mode parameters.

A transmission gap pattern sequence consists of alternating transmission gap patterns 1 and 2, each of these patterns in turn consists of one or two transmission gaps. See figure 1.

The following parameters ~~characterize~~characterise a transmission gap pattern:

- TGSN (Transmission Gap Starting Slot Number): A transmission gap pattern begins in a radio frame, henceforward called first radio frame of the transmission gap pattern, containing at least one transmission gap slot. TGSN is the slot number of the first transmission gap slot within the first radio frame of the transmission gap pattern;
- TGL1 (Transmission Gap Length 1): This is the duration of the first transmission gap within the transmission gap pattern, expressed in number of slots;
- TGL2 (Transmission Gap Length 2): This is the duration of the second transmission gap within the transmission gap pattern, expressed in number of slots. If this parameter is not explicitly set by higher layers, then TGL2 = TGL1;
- TGD (Transmission Gap start Distance): This is the duration between the starting slots of two consecutive transmission gaps within a transmission gap pattern, expressed in number of slots. The resulting position of the second transmission gap within its radio frame(s) shall comply with the limitations of [2]. If this parameter is not set by higher layers, then there is only one transmission gap in the transmission gap pattern;

- TGPL1 (Transmission Gap Pattern Length): This is the duration of transmission gap pattern 1, expressed in number of frames;

- TGPL2 (Transmission Gap Pattern Length): This is the duration of transmission gap pattern 2, expressed in number of frames. If this parameter is not explicitly set by higher layers, then TGPL2 = TGPL1.

The following parameters control the transmission gap pattern sequence start and repetition:

- TGPRC (Transmission Gap Pattern Repetition Count): This is the number of transmission gap patterns within the transmission gap pattern sequence;

- TGCFN (Transmission Gap Connection Frame Number): This is the CFN of the first radio frame of the first pattern 1 within the transmission gap pattern sequence.

In addition to the parameters defining the positions of transmission gaps, each transmission gap pattern sequence is ~~characterized~~characterised by:

- UL/DL compressed mode selection: This parameter specifies whether compressed mode is used in UL only, DL only or both UL and DL;

- UL compressed mode method: The methods for generating the uplink compressed mode gap are spreading factor division by two or higher layer scheduling and are described in [2];

- DL compressed mode method: The methods for generating the downlink compressed mode gap are puncturing, spreading factor division by two or higher layer scheduling and are described in [2];

- downlink frame type: This parameter defines if frame structure type 'A' or 'B' shall be used in downlink compressed mode. The frame structures are defined in [2];

- scrambling code change: This parameter indicates whether the alternative scrambling code is used for compressed mode method 'SF/2'. Alternative scrambling codes are described in [3];

- RPP: Recovery Period Power control mode specifies the uplink power control algorithm applied during recovery period after each transmission gap in compressed mode. RPP can take 2 values (0 or 1). The different power control modes are described in [4];

- ITP: Initial Transmit Power mode selects the uplink power control method to calculate the initial transmit power after the gap. ITP can take two values (0 or 1) and is described in [4].

The UE shall support simultaneous compressed mode pattern sequences which can be used for different measurements.

Table 1 lists the minimum number of parallel compressed mode patterns a UE shall support for each supported mode or feature while operating in FDD mode, assuming the UE needs compressed mode to perform measurements in support of that mode or feature. In case the UE supports multiple modes or features it shall support the sum of the respective minimum number of parallel compressed mode patterns listed in table 1 for each supported mode where the UE needs compressed mode to perform measurements. This applies independently to DL and UL directions.

~~The maximum number of simultaneous compressed mode pattern sequences depends on the supported modes and systems and is defined in the table below.~~

Table 1: Minimum number of parallel CM patterns

~~Supported modes/systems~~	~~Maximum number of parallel CM pattern sequences supported by the UE~~
~~FDD~~	~~2~~
~~FDD+TDD~~	~~3~~
~~FDD+GSM~~	~~5~~
~~FDD+TDD+GSM~~	~~6~~

Mode/Feature	Minimum number of parallel CM patterns
FDD	1
TDD	1
GSM	3
LCS	1

Higher layers will ensure that the compressed mode gaps do not overlap and are not scheduled to overlap the same frame. The behaviour when an overlap occurs is described in [11]~~TS 25.302~~.

In all cases, higher layers have control of individual UE parameters. Any pattern sequence can be stopped on higher layers' command.

The parameters TGSN, TGL1, TGL2, TGD, TGPL1, TGPL2, TGPRC and TGCFN shall all be integers.

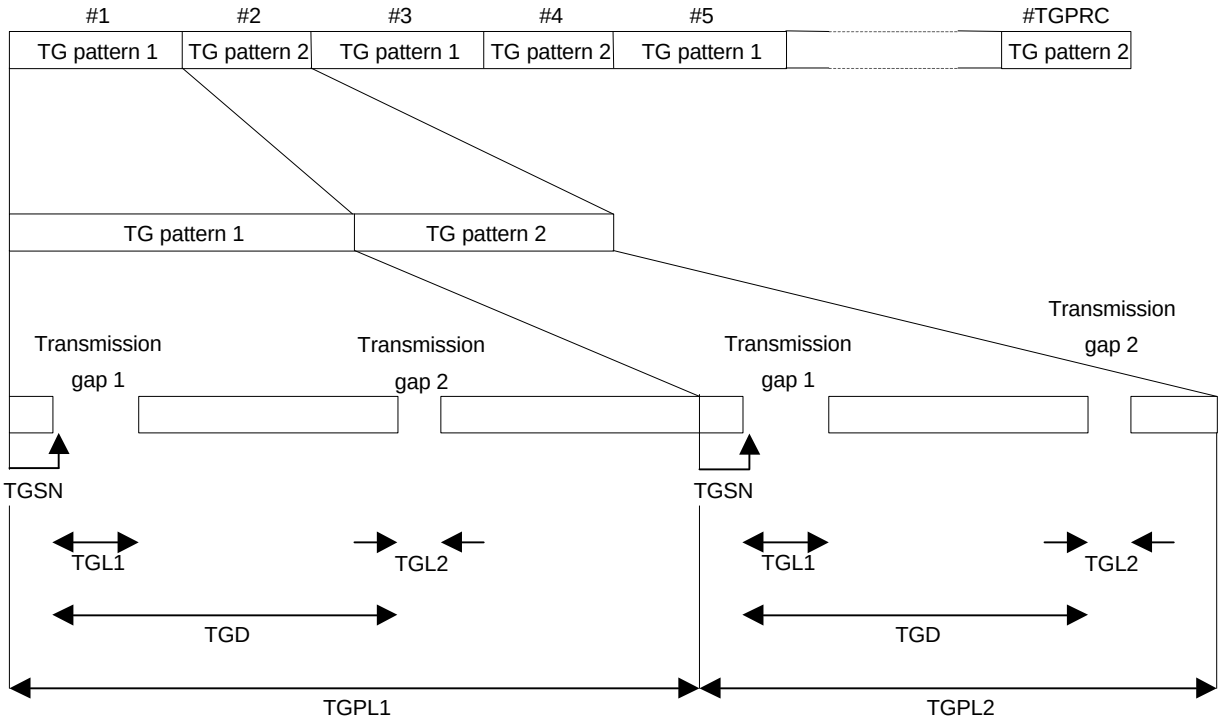

Figure 1: Illustration of compressed mode pattern parameters

6.1.1.3 Parameterisation limitations

~~In the t~~Table 2 shows ~~below~~ the supported values for the TGL1 and TGL2 parameters~~ are shown.~~

Table 2: Supported values for TGL1 and TGL2

Measurements performed on	Supported TGL1 values, when TGL2 is not set	Supported TGL1 and TGL2 values when both are set (TGL1, TGL2)
FDD inter-frequency cell	7, 14	(10, 5)
TDD cell	4	-
GSM cell	3, 4, 7, 10, 14	-
LCS	7, 14	-

~~Multi-mode t~~Terminals shall support all TGL1 and TGL2 values for ~~the~~ each supported mode~~s~~ or feature.

Depending on the starting slot and length of the gap, it can be placed within one single frame (single-frame method) or it can overlap two frames (double-frame method). ~~The following t~~Table 3 shows the combinations ~~That~~ which shall be supported in the UE for each supported TGL value. ~~are supported:~~

Table 3: Single-frame and double-frame configurations

TGL	Idle frame combining
3	(S) (D) = (1,2) or (2,1)
4	(S) (D) = (1,3), (2,2) or (3,1)
5	(S) (D) = (1,4), (2,3), (3, 2) or (4,1)
7	(S) (D) = (1,6), (2,5), (3,4), (4,3), (5,2) or (6,1)
10	(D) = (3,7), (4,6), (5,5), (6,4) or (7,3)
14	(D) = (7,7)

The notation used within the table 3 is:

(S): Single-frame method as specified in [2] ~~TS 25.212~~

(D): Double-frame method as specified in [2]~~TS 25.212~~: (x,y) indicates x: the number of idle slots in the first frame, y: the number of idle slots in the second frame.

Further limitations on the transmission gap position within its frame(s) are given in [2]~~TS 25.212~~.