TSG-RAN Meeting #22   **RP-030610**
Maui, USA, 09-12 December 2003

Title:	**SFN associated with GPS timing of cell frame: 25.331 CRs to R'99, Rel-4 and Rel-5**	
Source:	**TSG-RAN WG2**	
Agenda item:	**7.3.3**	

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New	Doc-2nd-Level	Workitem
25.331	2110	2	R99	SFN associated with GPS timing of cell frame	F	3.16.0	3.17.0	R2-032730	TEI
25.331	2111	2	Rel-4	SFN associated with GPS timing of cell frame	A	4.11.0	4.12.0	R2-032731	TEI
25.331	2112	2	Rel-5	SFN associated with GPS timing of cell frame	A	5.6.0	5.7.0	R2-032732	TEI

CR-Form-v7

CHANGE REQUEST

| ⌘ | **25.331** CR **2110** | ⌘**rev** | **2** | ⌘ | Current version: | **3.16.0** | ⌘ |

For **HELP** *on using this form, see bottom of this page or look at the pop-up text over the* ⌘ *symbols.*

Proposed change affects: UICC apps⌘ ☐   ME **X** Radio Access Network **X** Core Network ☐

Title: ⌘	SFN associated with GPS timing of cell frame	
Source: ⌘	RAN WG2	
Work item code:⌘	TEI	***Date:*** ⌘ 28/Nov/2003

Category: ⌘ **F**	***Release:*** ⌘ R99

Use one of the following categories:	*Use one of the following releases:*
F *(correction)*	2 *(GSM Phase 2)*
A *(corresponds to a correction in an earlier release)*	R96 *(Release 1996)*
	R97 *(Release 1997)*
B *(addition of feature),*	R98 *(Release 1998)*
C *(functional modification of feature)*	R99 *(Release 1999)*
D *(editorial modification)*	Rel-4 *(Release 4)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.	Rel-5 *(Release 5)*
	Rel-6 *(Release 6)*

Reason for change: ⌘	It is not clear whether the IE "SFN" associated with the IE "UTRAN GPS timing of cell frames" gives a SFN of the most recent frame or the next coming frame.

Most likely interpretation is "the most recent frame", since UTRAN performs corresponfing measurement before transmiting those IEs and with this interpretation UE doesn't have to wait for the frame indicated by the IE "SFN" before using those IEs. Additionally the IE "T$_{UTRAN-GPS}$ drift rate", which is the drift rate of the NODE B clock relative to GPS time, is usable only with this assumption.

However the ambiguity still exists due to the fact that other IEs such as "activation time", "TGCFN" and "BCCH modification time" indicate a frame in the future. It should therefore be clarified that the UE shall consider the IE "SFN" associated with the IE "UTRAN GPS timing of cell frames" gives a frame number of the most recent frame at the reception of the message containing those IEs.

The IE "Reference SFN" associated with the IE "UE GPS timing of cell frames" should also be clarified for the same reason.

Revision from R2-032307:
In section 10.3.7.109 semantics description for the IE "reference SFN" incorrectly mentions 'UTRAN timing of cell frame', instead of 'UE timing of cell frame'. |
| ***Summary of change:*** ⌘ | It is clarified that the IE "SFN" associated with the IE "UTRAN GPS timing of cell frames" and the IE "Reference SFN" associated with the IE "UE GPS timing of cell frames" give the latest frame with the inicated system frame number. |

		Revision from R2-032307: Changes are made in semantics description. 'UTRAN timing of cell frame' is changed to 'UE timing of cell frame' in section 10.3.7.109. Revision1: Changes on wording. Revision2: The corrections to section 10.3.7.88 and section 10.3.7.96 are withdrawn.
Consequences if not approved:	⌘	The IE "UE GPS timing of cell frames" is not usable. Incorrect description remains in the specification. **Isolated impact analysis:** This CR has isolated impact to the A-GSP. **Impact on test specifications:** No impact on test specification.

Clauses affected:	⌘	10.3.7.93, 10.3.7.109		

Other specs affected:	⌘	Y	N			
			X	Other core specifications	⌘	
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.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://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 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.

10.3.7.88 UE positioning GPS acquisition assistance

This IE contains parameters that enable fast acquisition of the GPS signals in UE-assisted GPS positioning.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
GPS TOW msec	MP		Integer(0..6. 048*10^8-1)	GPS Time of Week in milliseconds rounded down to the nearest millisecond unit.
UTRAN GPS reference time	OP			
>UTRAN GPS timing of cell frames	MP		Integer(0 ... 2322431999 999)	GPS timing of cell frames in steps of 1 chip.
>CHOICE *mode*	OP			
>>FDD				
>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>TDD				
>>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship
>SFN	MP		Integer(0..40 95)	The SFN which the UTRAN GPS timing of cell frames time stamps.
Satellite information	MP	1 to <maxSat>		
>SatID	MP		Integer (0..63)	
>Doppler (0th order term)	MP		Real(- 5120..5117.5 by step of 2.5)	Hz
>Extra Doppler	OP			
>>Doppler (1st order term)	MP		Real (- 0.966..0.483 by step of 0.023)	Scaling factor 1/42
>>Doppler Uncertainty	MP		Enumerated (12.5,25,50, 100,200)	Hz. Three spare values are needed.
>Code Phase	MP		Integer(0..10 22)	Chips, specifies the centre of the search window
>Integer Code Phase	MP		Integer(0..19)	1023 chip segments
>GPS Bit number	MP		Integer(0..3)	Specifies GPS bit number (20 1023 chip segments)
>Code Phase Search Window	MP		Integer(1023 ,1,2,3,4,6,8,1 2,16,24,32,4 8,64,96,128, 192)	Specifies the width of the search window.
>Azimuth and Elevation	OP			
>>Azimuth	MP		Real(0..348. 75 by step of 11.25)	Degrees
>>Elevation	MP		Real(0..78.7 5 by step of 11.25)	Degrees

10.3.7.93 UE positioning GPS measured results

Information Element/Group name	Need	Multi	Type and Reference	Semantics description

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *Reference Time*	MP			
>UTRAN reference time				
>>UE GPS timing of cell frames	MP		Integer(0.. 3715891199 9999)	GPS Time of Week in units of 1/16th UMTS chips according to [19]. 33209832177664 spare values are needed.
>>CHOICE *mode*	MP			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship.
>>>TDD				
>>>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship.
>>Reference SFN	MP		Integer(0..40 95)	The SFN for which the location is valid. ~~If UE GPS timing of cell frames is included this is also the SFN which is time-stamped.~~This IE indicates the SFN at which the UE timing of cell frames is captured.
>GPS reference time only				
>>GPS TOW msec	MP		Integer(0..6. 048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit). This time is the GPS TOW measured by the UE.
Measurement Parameters	MP	1 to \<maxSat\>		
>Satellite ID	MP		Enumerated(0..63)	
>C/N$_o$	MP		Integer(0..63)	the estimate of the carrier-to-noise ratio of the received signal from the particular satellite used in the measurement. It is given in units of dB-Hz (typical levels will be in the range of 20 – 50 dB-Hz).
>Doppler	MP		Integer(- 32768..3276 8)	Hz, scale factor 0.2.
>Whole GPS Chips	MP		Integer(0..10 22)	Unit in GPS chips.
>Fractional GPS Chips	MP		Integer(0..(2^{10}-1))	Scale factor 2^{-10}
>Multipath Indicator	MP		Enumerated(NM, low, medium, high)	Note 1.
>Pseudorange RMS Error	MP		Enumerated(range index 0..range index 63)	Note 2.

10.3.7.96   UE positioning GPS reference time

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
GPS Week	MP		Integer(0..10 23)	
GPS TOW msec	MP		Integer(0..6.	GPS Time of Week in

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
			048*10^8-1)	milliseconds (rounded down to the nearest millisecond unit).
UTRAN GPS reference time	OP			
>UTRAN GPS timing of cell frames	MP		Integer(0.. 2322431999 999)	UTRAN GPS timing of cell frames in steps of 1 chip
>CHOICE *mode*	OP			
>>FDD				
>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>TDD				
>>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship
>SFN	MP		Integer(0..40 95)	The SFN which the UTRAN GPS timing of cell frames time stamps.
SFN-TOW Uncertainty	OP		Enumerated (lessThan10, moreThan10)	This field indicates the uncertainty of the relation GPS TOW/SFN. lessThan10 means the relation is accurate to at least 10 ms.
T$_{UTRAN-GPS}$ drift rate	OP		Integer (0, 1, 2, 5, 10, 15, 25, 50, -1, -2, -5, -10, -15, -25, -50)	in 1/256 chips per sec.
GPS TOW Assist	OP	1 to \<maxSat\>		
>SatID	MP		Enumerated(0..63)	
>TLM Message	MP		Bit string(14)	
>TLM Reserved	MP		Bit string(2)	
>Alert	MP		Boolean	
>Anti-Spoof	MP		Boolean	

10.3.7.109   UE positioning position estimate info

The purpose of this IE is to provide the position estimate from the UE to the network, if the UE is capable of determining its own position.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *Reference Time*	MP			
>UTRAN GPS reference time				
>>UE GPS timing of cell frames	MP		Integer(0.. 3715891199 9999)	GPS Time of Week in units of 1/16th UMTS chips according to [19]. 33209832177664 spare values are needed.
>>CHOICE *mode*	MP			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>>TDD				
>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship.
>>Reference SFN	MP		Integer(0..40 95)	The SFN for which the location is valid. and which the

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
				~~UTRAN~~UE GPS timing of cell frames time ~~stamps~~stamped. This IE indicates the SFN at which the UE timing of cell frame is captured.
>GPS reference time only				
>>GPS TOW msec	MP		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit).
>Cell timing				
>>SFN	MP		Integer(0..4095)	SFN during which the position was calculated.
>>CHOICE mode	MP			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for SFN
>>>TDD				
>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies reference cell for SFN
CHOICE Position estimate	MP			
>Ellipsoid Point			Ellipsoid Point; 10.3.8.4a	
>Ellipsoid point with uncertainty circle			Ellipsoid point with uncertainty circle 10.3.8.4d	
>Ellipsoid point with uncertainty ellipse			Ellipsoid point with uncertainty ellipse 10.3.8.4e	
>Ellipsoid point with altitude			Ellipsoid point with altitude 10.3.8.4b	
>Ellipsoid point with altitude and uncertainty ellipsoid			Ellipsoid point with altitude and uncertainty ellipsoid 10.3.8.4c	

CR-Form-v7

CHANGE REQUEST

⌘ **25.331** CR **2111** ⌘**rev** **2** ⌘ Current version: **4.11.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME **X** Radio Access Network **X** Core Network ☐

Title: ⌘	SFN associated with GPS timing of cell frame	
Source: ⌘	RAN WG2	
Work item code: ⌘	TEI	*Date:* ⌘ 28/Nov/2003
Category: ⌘ **A**		*Release:* ⌘ Rel-4

Use one of the following categories:
F (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)
Rel-6 (Release 6)

Reason for change: ⌘	It is not clear whether the IE "SFN" associated with the IE "UTRAN GPS timing of cell frames" gives a SFN of the most recent frame or the next coming frame.

Most likely interpretation is "the most recent frame", since UTRAN performs corresponfing measurement before transmiting those IEs and with this interpretation UE doesn't have to wait for the frame indicated by the IE "SFN" before using those IEs. Additionally the IE "T$_{UTRAN-GPS}$ drift rate", which is the drift rate of the NODE B clock relative to GPS time, is usable only with this assumption.

However the ambiguity still exists due to the fact that other IEs such as "activation time", "TGCFN" and "BCCH modification time" indicate a frame in the future. It should therefore be clarified that the UE shall consider the IE "SFN" associated with the IE "UTRAN GPS timing of cell frames" gives a frame number of the most recent frame at the reception of the message containing those IEs.

The IE "Reference SFN" associated with the IE "UE GPS timing of cell frames" should also be clarified for the same reason.

Revision from R2-032308:
In section 10.3.7.109 semantics description for the IE "reference SFN" incorrectly mentions 'UTRAN timing of cell frame', instead of 'UE timing of cell frame'. |
| *Summary of change:* ⌘ | It is clarified that the IE "SFN" associated with the IE "UTRAN GPS timing of cell frames" and the IE "Reference SFN" associated with the IE "UE GPS timing of cell frames" give the latest frame with the inicated system frame number. |

		Revision from R2-032308: Changes are made in semantics description. 'UTRAN timing of cell frame' is changed to 'UE timing of cell frame' in section 10.3.7.109. Revision1: Changes on wording. Revision2: The corrections to section 10.3.7.88 and section 10.3.7.96 are withdrawn.
Consequences if not approved:	⌘	The IE "UE GPS timing of cell frames" is not usable. Incorrect description remains in the specification. **Isolated impact analysis:** This CR has isolated impact to the A-GSP. **Impact on test specifications:** No impact on test specification.

Clauses affected:	⌘	10.3.7.93, 10.3.7.109

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.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://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 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.

10.3.7.88 UE positioning GPS acquisition assistance

This IE contains parameters that enable fast acquisition of the GPS signals in UE-assisted GPS positioning.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
GPS TOW msec	MP		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds rounded down to the nearest millisecond unit.
UTRAN GPS reference time	OP			
>UTRAN GPS timing of cell frames	MP		Integer(0 ... 2322431999999)	GPS timing of cell frames in steps of 1 chip.
>CHOICE *mode*	OP			
>>FDD				
>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>TDD				
>>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship
>SFN	MP		Integer(0..4095)	The SFN which the UTRAN GPS timing of cell frames time stamps.
Satellite information	MP	1 to <maxSat>		
>SatID	MP		Integer (0..63)	
>Doppler (0th order term)	MP		Real(-5120..5117.5 by step of 2.5)	Hz
>Extra Doppler	OP			
>>Doppler (1st order term)	MP		Real (-0.966..0.483 by step of 0.023)	Scaling factor 1/42
>>Doppler Uncertainty	MP		Enumerated (12.5,25,50,100,200)	Hz. Three spare values are needed.
>Code Phase	MP		Integer(0..1022)	Chips, specifies the centre of the search window
>Integer Code Phase	MP		Integer(0..19)	1023 chip segments
>GPS Bit number	MP		Integer(0..3)	Specifies GPS bit number (20 1023 chip segments)
>Code Phase Search Window	MP		Integer(1023,1,2,3,4,6,8,12,16,24,32,48,64,96,128,192)	Specifies the width of the search window.
>Azimuth and Elevation	OP			
>>Azimuth	MP		Real(0..348.75 by step of 11.25)	Degrees
>>Elevation	MP		Real(0..78.75 by step of 11.25)	Degrees

10.3.7.93 UE positioning GPS measured results

Information Element/Group name	Need	Multi	Type and Reference	Semantics description

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *Reference Time*	MP			
>UTRAN reference time				
>>UE GPS timing of cell frames	MP		Integer(0.. 3715891199 9999)	GPS Time of Week in units of 1/16th UMTS chips according to [19]. 33209832177664 spare values are needed.
>>CHOICE *mode*	MP			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship.
>>>TDD				
>>>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship.
>>Reference SFN	MP		Integer(0..40 95)	The SFN for which the location is valid. ~~If UE GPS timing of cell frames is included this is also the SFN which is time stamped.~~ This IE indicates the SFN at which the UE timing of cell frames is captured.
>GPS reference time only				
>>GPS TOW msec	MP		Integer(0..6. 048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit). This time is the GPS TOW measured by the UE.
Measurement Parameters	MP	1 to <maxSat>		
>Satellite ID	MP		Enumerated(0..63)	
>C/N_o	MP		Integer(0..63)	the estimate of the carrier-to-noise ratio of the received signal from the particular satellite used in the measurement. It is given in units of dB-Hz (typical levels will be in the range of 20 – 50 dB-Hz).
>Doppler	MP		Integer(-32768..3276 8)	Hz, scale factor 0.2.
>Whole GPS Chips	MP		Integer(0..10 22)	Unit in GPS chips.
>Fractional GPS Chips	MP		Integer(0..(2^{10}-1))	Scale factor 2^{-10}
>Multipath Indicator	MP		Enumerated(NM, low, medium, high)	Note 1.
>Pseudorange RMS Error	MP		Enumerated(range index 0..range index 63)	Note 2.

NOTE 1: The following table gives the mapping of the multipath indicator field.

Value	Multipath Indication
NM	Not measured
Low	MP error < 5m
Medium	5m < MP error < 43m
High	MP error > 43m

NOTE 2: The following table gives the bitmapping of the Pseudorange RMS Error field.

Range Index	Mantissa	Exponent	Floating-Point value, x_i	Pseudorange value, P
0	000	000	0.5	P < 0.5
1	001	000	0.5625	0.5 <= P < 0.5625
I	X	Y	$0.5 * (1 + x/8) * 2^y$	x_{i-1} <= P < x_i
62	110	111	112	104 <= P < 112
63	111	111	--	112 <= P

10.3.7.96   UE positioning GPS reference time

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
GPS Week	MP		Integer(0..1023)	
GPS TOW msec	MP		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit).
UTRAN GPS reference time	OP			
>UTRAN GPS timing of cell frames	MP		Integer(0..2322431999999)	UTRAN GPS timing of cell frames in steps of 1 chip
>CHOICE *mode*	OP			
>>FDD				
>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>TDD				
>>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship
>SFN	MP		Integer(0..4095)	The SFN which the UTRAN GPS timing of cell frames time stamps.
SFN-TOW Uncertainty	OP		Enumerated (lessThan10, moreThan10)	This field indicates the uncertainty of the relation GPS TOW/SFN. lessThan10 means the relation is accurate to at least 10 ms.
T$_{UTRAN-GPS}$ drift rate	OP		Integer (0, 1, 2, 5, 10, 15, 25, 50, -1, -2, -5, -10, -15, -25, -50)	in 1/256 chips per sec.
GPS TOW Assist	OP	1 to \<maxSat>		
>SatID	MP		Enumerated(0..63)	
>TLM Message	MP		Bit string(14)	
>TLM Reserved	MP		Bit string(2)	
>Alert	MP		Boolean	
>Anti-Spoof	MP		Boolean	

10.3.7.109 UE positioning position estimate info

The purpose of this IE is to provide the position estimate from the UE to the network, if the UE is capable of determining its own position.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *Reference Time*	MP			
>UTRAN GPS reference time				
>>UE GPS timing of cell frames	MP		Integer(0.. 3715891199 9999)	GPS Time of Week in units of 1/16th UMTS chips according to [19]. 33209832177664 spare values are needed.
>>CHOICE *mode*	MP			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>>TDD				
>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship.
>>Reference SFN	MP		Integer(0..4095)	The SFN for which the location is valid. and which the ~~UTRAN~~ UE GPS timing of cell frames time stampsstamped. This IE indicates the SFN at which the UE timing of cell frames is captured.
>GPS reference time only				
>>GPS TOW msec	MP		Integer(0..6. 048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit).
>Cell timing				
>>SFN	MP		Integer(0..4095)	SFN during which the position was calculated.
>>CHOICE *mode*	MP			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for SFN
>>>TDD				
>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies reference cell for SFN
CHOICE *Position estimate*	MP			
>Ellipsoid Point			Ellipsoid Point; 10.3.8.4a	
>Ellipsoid point with uncertainty circle			Ellipsoid point with uncertainty circle 10.3.8.4d	
>Ellipsoid point with uncertainty ellipse			Ellipsoid point with uncertainty ellipse 10.3.8.4e	
>Ellipsoid point with altitude			Ellipsoid point with altitude 10.3.8.4b	

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
>Ellipsoid point with altitude and uncertainty ellipsoid			Ellipsoid point with altitude and uncertainty ellipsoid 10.3.8.4c	

CR-Form-v7

CHANGE REQUEST

| ⌘ | **25.331** CR **2112** | ⌘rev | **2** | ⌘ | Current version: | **5.6.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐   ME **X** Radio Access Network **X** Core Network ☐

Title: ⌘	SFN associated with GPS timing of cell frame	
Source: ⌘	RAN WG2	
Work item code: ⌘	TEI	*Date:* ⌘ 28/Nov/2003
Category: ⌘	**A**	*Release:* ⌘ Rel-5

Use *one* of the following categories:
F *(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)*
Rel-6 *(Release 6)*

Reason for change: ⌘	It is not clear whether the IE "SFN" associated with the IE "UTRAN GPS timing of cell frames" gives a SFN of the most recent frame or the next coming frame.

Most likely interpretation is "the most recent frame", since UTRAN performs correcponfing measurement before transmiting those IEs and with this interpretation UE doesn't have to wait for the frame indicated by the IE "SFN" before using those IEs. Additionally the IE "T$_{UTRAN-GPS}$ drift rate", which is the drift rate of the NODE B clock relative to GPS time, is usable only with this assumption.

However the ambiguity still exists due to the fact that other IEs such as "activation time", "TGCFN" and "BCCH modification time" indicate a frame in the future. It should therefore be clarified that the UE shall consider the IE "SFN" associated with the IE "UTRAN GPS timing of cell frames" gives a frame number of the most recent frame at the reception of the message containing those IEs.

The IE "Reference SFN" associated with the IE "UE GPS timing of cell frames" should also be clarified for the same reason.

Revision from R2-032309:
In section 10.3.7.109 semantics description for the IE "reference SFN" incorrectly mentions 'UTRAN timing of cell frame', instead of 'UE timing of cell frame'. |
| *Summary of change:* ⌘ | It is clarified that the IE "SFN" associated with the IE "UTRAN GPS timing of cell frames" and the IE "Reference SFN" associated with the IE "UE GPS timing of cell frames" give the latest frame with the inicated system frame number. |

	⌘	Revision from R2-032309: Changes are made in semantics description. 'UTRAN timing of cell frame' is changed to 'UE timing of cell frame' in section 10.3.7.109. Revision1: Changes on wording. Revision2: The corrections to section 10.3.7.88 and section 10.3.7.96 are withdrawn.
Consequences if not approved:	⌘	The IE "UE GPS timing of cell frames" is not usable. Incorrect description remains in the specification. **Isolated impact analysis:** This CR has isolated impact to the A-GSP. **Impact on test specifications:** No impact on test specification.

Clauses affected:	⌘	10.3.7.93, 10.3.7.109

Other specs affected:	⌘	Y	N		⌘	
			X	Other core specifications	⌘	
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.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://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 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.

10.3.7.88 UE positioning GPS acquisition assistance

This IE contains parameters that enable fast acquisition of the GPS signals in UE-assisted GPS positioning.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
GPS TOW msec	MP		Integer(0..6. 048*10^8-1)	GPS Time of Week in milliseconds rounded down to the nearest millisecond unit.
UTRAN GPS reference time	OP			
>UTRAN GPS timing of cell frames	MP		Integer(0 ... 2322431999 999)	GPS timing of cell frames in steps of 1 chip.
>CHOICE *mode*	OP			
>>FDD				
>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>TDD				
>>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship
>SFN	MP		Integer(0..40 95)	The SFN which the UTRAN GPS timing of cell frames time stamps.
Satellite information	MP	1 to \<maxSat\>		
>SatID	MP		Integer (0..63)	
>Doppler (0th order term)	MP		Real(- 5120..5117.5 by step of 2.5)	Hz
>Extra Doppler	OP			
>>Doppler (1st order term)	MP		Real (- 0.966..0.483 by step of 0.023)	Scaling factor 1/42
>>Doppler Uncertainty	MP		Enumerated (12.5,25,50, 100,200)	Hz. Three spare values are needed.
>Code Phase	MP		Integer(0..10 22)	Chips, specifies the centre of the search window
>Integer Code Phase	MP		Integer(0..19)	1023 chip segments
>GPS Bit number	MP		Integer(0..3)	Specifies GPS bit number (20 1023 chip segments)
>Code Phase Search Window	MP		Integer(1023 ,1,2,3,4,6,8,1 2,16,24,32,4 8,64,96,128, 192)	Specifies the width of the search window.
>Azimuth and Elevation	OP			
>>Azimuth	MP		Real(0..348. 75 by step of 11.25)	Degrees
>>Elevation	MP		Real(0..78.7 5 by step of 11.25)	Degrees

10.3.7.93 UE positioning GPS measured results

Information Element/Group name	Need	Multi	Type and Reference	Semantics description

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *Reference Time*	MP			
>UTRAN reference time				
>>UE GPS timing of cell frames	MP		Integer(0.. 3715891199 9999)	GPS Time of Week in units of $1/16^{th}$ UMTS chips according to [19]. 33209832177664 spare values are needed.
>>CHOICE *mode*	MP			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship.
>>>TDD				
>>>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship.
>>Reference SFN	MP		Integer(0..40 95)	The SFN for which the location is valid. ~~If UE GPS timing of cell frames is included this is also the SFN which is time stamped.~~ This IE indicates the SFN at which the UE timing of cell frames is captured.
>GPS reference time only				
>>GPS TOW msec	MP		Integer(0..6. 048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit). This time is the GPS TOW measured by the UE.
Measurement Parameters	MP	1 to <maxSat>		
>Satellite ID	MP		Enumerated(0..63)	
>C/N$_o$	MP		Integer(0..63)	the estimate of the carrier-to-noise ratio of the received signal from the particular satellite used in the measurement. It is given in units of dB-Hz (typical levels will be in the range of 20 – 50 dB-Hz).
>Doppler	MP		Integer(- 32768..3276 8)	Hz, scale factor 0.2.
>Whole GPS Chips	MP		Integer(0..10 22)	Unit in GPS chips.
>Fractional GPS Chips	MP		Integer(0..(2^{10}-1))	Scale factor 2^{-10}
>Multipath Indicator	MP		Enumerated(NM, low, medium, high)	Note 1.
>Pseudorange RMS Error	MP		Enumerated(range index 0..range index 63)	Note 2.

NOTE 1: The following table gives the mapping of the multipath indicator field.

Value	Multipath Indication
NM	Not measured
Low	MP error < 5m
Medium	5m < MP error < 43m
High	MP error > 43m

NOTE 2: The following table gives the bitmapping of the Pseudorange RMS Error field.

Range Index	Mantissa	Exponent	Floating-Point value, x_i	Pseudorange value, P
0	000	000	0.5	P < 0.5
1	001	000	0.5625	0.5 <= P < 0.5625
I	X	Y	$0.5 * (1 + x/8) * 2^y$	$x_{i-1} <= P < x_i$
62	110	111	112	104 <= P < 112
63	111	111	--	112 <= P

10.3.7.96   UE positioning GPS reference time

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
GPS Week	MP		Integer(0..1023)	
GPS TOW msec	MP		Integer(0..6.048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit).
UTRAN GPS reference time	OP			
>UTRAN GPS timing of cell frames	MP		Integer(0..2322431999 999)	UTRAN GPS timing of cell frames in steps of 1 chip
>CHOICE *mode*	OP			
>>FDD				
>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>TDD				
>>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship
>SFN	MP		Integer(0..4095)	The SFN which the UTRAN GPS timing of cell frames time stamps.
SFN-TOW Uncertainty	OP		Enumerated (lessThan10, moreThan10)	This field indicates the uncertainty of the relation GPS TOW/SFN. lessThan10 means the relation is accurate to at least 10 ms.
$T_{UTRAN-GPS}$ drift rate	OP		Integer (0, 1, 2, 5, 10, 15, 25, 50, -1, -2, -5, -10, -15, -25, -50)	in 1/256 chips per sec.
GPS TOW Assist	OP	1 to <maxSat>		
>SatID	MP		Enumerated(0..63)	
>TLM Message	MP		Bit string(14)	
>TLM Reserved	MP		Bit string(2)	
>Alert	MP		Boolean	
>Anti-Spoof	MP		Boolean	

10.3.7.109   UE positioning position estimate info

The purpose of this IE is to provide the position estimate from the UE to the network, if the UE is capable of determining its own position.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
CHOICE *Reference Time*	MP			
>UTRAN GPS reference time				
>>UE GPS timing of cell frames	MP		Integer(0.. 3715891199 9999)	GPS Time of Week in units of 1/16th UMTS chips according to [19]. 33209832177664 spare values are needed.
>>CHOICE *mode*	MP			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for the GPS TOW-SFN relationship
>>>TDD				
>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies the reference cell for the GPS TOW-SFN relationship.
>>Reference SFN	MP		Integer(0..40 95)	The SFN for which the location is valid. ~~and which the~~ UTRAN UE GPS timing of cell frames ~~time stampsstamped~~. This IE indicates the SFN at which the UE timing of cell frame is captured.
>GPS reference time only				
>>GPS TOW msec	MP		Integer(0..6. 048*10^8-1)	GPS Time of Week in milliseconds (rounded down to the nearest millisecond unit).
>Cell timing				
>>SFN	MP		Integer(0..40 95)	SFN during which the position was calculated.
>>CHOICE *mode*	MP			
>>>FDD				
>>>>Primary CPICH Info	MP		Primary CPICH Info 10.3.6.60	Identifies the reference cell for SFN
>>>TDD				
>>cell parameters id	MP		Cell parameters id 10.3.6.9	Identifies reference cell for SFN
CHOICE *Position estimate*	MP			
>Ellipsoid Point			Ellipsoid Point; 10.3.8.4a	
>Ellipsoid point with uncertainty circle			Ellipsoid point with uncertainty circle 10.3.8.4d	
>Ellipsoid point with uncertainty ellipse			Ellipsoid point with uncertainty ellipse 10.3.8.4e	
>Ellipsoid point with altitude			Ellipsoid point with altitude 10.3.8.4b	

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
>Ellipsoid point with altitude and uncertainty ellipsoid			Ellipsoid point with altitude and uncertainty ellipsoid 10.3.8.4c	