TSG-RAN Meeting #10 *RP-000575*
Bangkok, Thailand, 6 - 8 December 2000

Title: **Agreed CRs to TR 25.921**

Source: **TSG-RAN WG2**

Agenda item: **5.2.3**

Doc-1st-	Status-	Spec	CR	Rev	Subject	Cat	Version	Versio
R2-002373	agreed	25.921	007		Extension rules for supporting future releases	F	3.1.0	3.2.0

3GPP TSG-RAN WG2 Meeting #17 ***Tdoc R2-002373***
Sophia-Antipolis, France, 13-17 November 2000

CR-Form-v3

CHANGE REQUEST

⌘ **25.921** **CR** **007** ⌘ rev **-** ⌘ Current version: **3.1.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☒ Radio Access Network ☒ Core Network ☐

Title:	⌘	Extension rules for supporting future releases
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	***Date:*** ⌘ 15/11/2000
Category:	⌘	**F** ***Release:*** ⌘ R99

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

Reason for change:	⌘	Specification of extension mecanisms for REL-4 and further
Summary of change:	⌘	Extension rules are defined on R99 messages for supporting future releases. Usage of Tabular format and ASN.1 are updated.
Consequences if not approved:	⌘	RRC protocols not compatible from one release to another

Clauses affected:	⌘	9.1.1.2, 9.1.1.2.1.1, 9.1.1.2.1.2, 9.1.1.2.1.3, 9.1.1.2.1.4, 9.1.1.2.1.5, 9.1.1.2.4, 9.1.1.2.5 (new), 9.1.2, 9.1.3 (new), 9.1.3.1 (new), 9.1.3.2 (new), 9.1.3.3 (new), 9.2.1, 9.2.2, 9.2.3, 9.2.4, 9.2.5, 9.2.6,10.3 (new), 10.3.1 (new), 10.3.2 (new)
Other specs affected:	⌘	☒ Other core specifications ⌘ TS 25.331 ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	Related to tdoc R2-002163. It is needed to make another CR to remove all previous mecanisms. The rules are not compatiblewith present TS 25.331 and it is needed to be updated. There are some FFS issues added to minute that all issues are not solved yet.

How to create CRs using this form:
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.

9 Usage of tabular format

A protocol specification should include a 'Tabular description' subclause, including:

- A message description subclause;
- An IE description subclause.

9.1 Tabular description of messages and IEs

9.1.1 Message description

A 'Message description' subclause includes one subclause per message.

A message is described with, in this order:

- A general description, including the flow the message belongs to (e.g., SAP, direction,…); this indirectly points to the message header description, which is not described again for each message;
- A table describing a list of information elements;
- Explanatory clauses, mainly for describing textually conditions for presence or absence of some IEs.

9.1.1.1 The general description

9.1.1.2 The Information Element table

The table is composed of 6~~5~~ columns, labelled and presented as shown below.

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version

NOTE: Indentations are used to visualise the embedding level of an "IE/Group" or "Type and reference".

Indentations are explicitely written with the character ">", one per level of indentation. Indentations of lines can be found in IE/Group Name and Type and reference columns.

Each line corresponds either to an IE or to a group. A group includes all the IEs in following lines until, and not including, a line with the same indentation as the group line.

Dummy groups can be used for legibility: the following IE/Group has the same indentation. For such dummy groups, the Need and Multi columns are meaningless and should be left empty.

The "Type and reference" column is not filled in the case of a group line and must be filled for "IE/Group Name" column.

This column gives the local name of the IE or of a group of IEs. This name is significant only within the scope of the described message, and must appear only once in the column at the same level of indentation. It is a free text, which should be chosen to reflect the meaning of the IE or group of IEs. This text is to be used followed by the key word IE, the whole enclosed between quotes [or in italics] to refer to the IE or the group of IEs in the procedural description.

The first word 'choice' has a particular meaning, and must not be used otherwise.

9.1.1.2.1 Need and multiplicity (Multi) columns

These columns provide most of the information about the presence, absence and number of copy of the IE (in the message or in the group) or group of IEs. The different possibilities for these columns are described one by one.

The meaning of the 'need' column is summarised below:

MP Mandatorily present.

A value for that information is always needed, and no information is provided about a particular default value. If ever the transfer syntax allows absence (e.g., due to extension), then absence leads to an error diagnosis.

MD Mandatory with default value.

A value for that information is always needed, and a particular default value is mentioned (in the "Semantical information" column). This opens the possibility for the transfer syntax to use absence or a special pattern to encode the default value.

CV Conditional on value.

A value for that information is needed (presence needed) or unacceptable (absence needed) when some conditions are met that can be evaluated on the sole basis of the content of the message.

If conditions for presence needed are specified, the transfer syntax must allow for the presence of the information. If the transfer syntax allows absence, absence when the conditions for presence are met leads to an error diagnosis.

If conditions for absence needed are specified, the transfer syntax must allow to encode the absence. If the information is present and the conditions for absence are met, an error is diagnosed.

When neither conditions for presence or absence are met, the information is treated as optional, as described for "OP".

CH Conditional on history.

A value for that information is needed (presence needed) or unacceptable (absence needed) when some conditions are met that must be evaluated on the basis of information obtained in the past (e.g., from messages received in the past from the other party).

If conditions for presence needed are specified, the transfer syntax must allow for the presence of the information. If the transfer syntax allows absence, absence when the conditions for presence are met leads to an error diagnosis.

If conditions for absence needed are specified, the transfer syntax must allow to encode the absence. If the information is present and the conditions for absence are met, an error is diagnosed.

When neither conditions for presence or absence are met, the information is treated as optional, as described for "OP".

OP Optional.

The presence or absence is significant and modifies the behaviour of the receiver. However whether the information is present or not does not lead to an error diagnosis.

9.1.1.2.1.1 Mandatory

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version
Name	MP				
Name	MD			(default value is indicated)	

The multiplicity column must be left empty.

For an IE not belonging to a group MP indicates that one and only one copy of "Name IE" is necessary in the message.

For a group not belonging to another group, MP means that one and only one copy of the "Name group" is necessary in the message.

For an IE or a group belonging to another group, MP means that if the parent group is present, then one and only one copy of the "Name group" or "Name IE" is necessary in the embedding group.

For an IE not belonging to a group MD indicates that one and only one value for information 'Name IE' is necessary in the message, and that a special value (the default value) exists and is mentioned in the 'Semantics description' column.

For a group not belonging to another group, MD means that one and only one value for information structure 'Name group' is necessary in the message, and that a special value (the default value) exists and is mentioned in the 'Semantics description' column.

For an IE or a group belonging to another group, MD means that if the parent group is present, then one and only one value for information structure 'Name group' or information 'Name IE' is necessary in the embedding group, and that a special value (the default value) exists and is mentioned in the 'Semantics description' column.

The default value might be fixed by the standard, or conditional to the value of some other IE or IEs, or conditional on information obtained in the past.

9.1.1.2.1.2 Optional

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version
Name	OP				

The multiplicity column is empty.

This indicates that the 'Name IE' or 'Name group' is not necessary in the message or the embedding group, and that the sender can choose not to include it.

9.1.1.2.1.3 Conditional

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version
	CV *cond*				
	CH				

The multiplicity column is empty.

CV indicates that the requirement for presence of absence of the IE or group of IE depends on the value of some other IE or IEs, and/or on the message flow (e.g., channel, SAP). In the CV case, the condition is to be described in a textual form in an explanatory clause. *cond* stands for a free text that is used as a reference in the title of the explanatory clause. In the CH case, the condition is described in the procedural section.

When condition is met may means that IE is:

- Mandatorily present.
- Mandatorily absent.
- Optional.
- Absent, but optional (this is meaningful only for extension).

9.1.1.2.1.4 Choice

This is particular group of at least two children.

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version
Choice *name*					
>Name1					
>Name2					

A 'choice' group is distinguished from standard groups by the use of 'choice' as first word in the name.

The Need and Multi columns are filled normally for the group line. They are not filled for the children lines: the implicit value is conditional, one condition being that one and only one of the children is present if the group is present.

If additional conditions (depending on the value of some other IE or IEs, and/or on the message flow) exist for the choice, they are explained in an explanatory clause.

9.1.1.2.1.5 Sets

In general, this indicates that more than one copy of an IE/Group might be necessary in the message.

The two lines below indicate different allowed alternatives.

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version
Name		nn..pp			
Name		nn..indefinite			
Name		nn..sym2			
Name		sym1..pp			
Name		sym1..sym2			
Name	Cx cond	nn ..pp			
Name	Cx cond	nn..indefinite			
Name	Cx cond	nn..sym2			
Name	Cx cond	sym1..pp			
Name	Cx cond	sym1..sym2			

Where *nn* and *pp* stand for positive integers, and *sym1* and *sym2* for symbolic names. The Need column can be empty, CV or CH.

The notation '..' can be replaced with the same meaning by 'to'.

This indicates that a number of copies of the IE/Group are necessary in the message/embedding group. The order is significant. The reference should use the bracket notation (e.g., 'Name[1] IE') to refer to a specific copy; numbering starts by 1.

The *nn..pp* case indicates that the number of copies is between nn and pp, inclusively. This means that *nn* copies are necessary in the message, that additional *pp-nn* copies are optional and meaningful, and that copies after the *pp*th are not necessary.

The number *nn* is positive or null. The number *pp* must be equal or greater than *nn*. The 1..1 case should be avoided, and a MP indication used instead. Similarly, the 0..1 case should be avoided and replaced by an OP indication.

The *nn*..indefinite case indicates that the number of copies is *nn* or greater. This means that *nn* copies are necessary in the message, and that additional copies are optional and meaningful. The number *nn* is positive or null. It is however allowed that the transfer syntax puts some practical limits on the maximum number of copies.

The use of a symbolic name for one or the other of the range bounds indicates that the value is given in a textual clause. This is necessary the case when the bound depends is conditional to the value of some other IE or IEs.

The 'Need' column is set to CV or CH followed by a condition name to indicate that the number of necessary or optional copies is conditional to the value of some other IE or IEs, or on the flow (CV case) or to information obtained in the past (CH case). An explanatory clause describes the condition. Otherwise, the column is left empty.

9.1.1.2.2 Type and reference column

This column is not filled for groups and must be filled for IEs.

This column includes the reference to a more detailed abstract description of the IE. This includes:

a) A reference to a subclause in the Information Element Description clause in the same document; Typically the subclause number and titles are given, and if possible this should be a hypertext link;

b) A reference to another document, and to a subclause in the Information Element Description clause in the indicated document; typically only the subclause title is indicated;

c) A reference to a subclause of this document, with possibly additional information as described.

9.1.1.2.3 Semantics description

Filling this column is optional. It should be use to clarify the meaning of the IE or group of IE, as a summary of their use as described in the procedural part.

9.1.1.2.4 Expressing differences between FDD and TDD modes

If a PDU or a strucured information element contain information elements whose Need value is different for FDD and TDD modes or if a certain structured information element is completely different for the two modes, a choice group should be used.

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version
Choice systemtype					
>FDD					
>>element1	MP				
>>element2	OP				
>TDD					
>>element3	OP				
>>element4	MP				

9.1.1.2.5 Version column

When a row is added from one version to a latter one, the version (eg : REL-4, REL-5) is added in the version column.

By convention it is left blank for Release 99.

9.1.1.3 Explanatory clauses

This includes the subclauses needed to elaborate conditions and symbolic names (e.g., range bounds). There must be one explanatory clause for each named condition, and for each symbolic name. The text must give the information sufficient to decide whether the IE/group is to be included or not, or the value of the symbolic name.

9.1.2 IE type description

This describes IE types referred elsewhere, either in the description of a message or in the description of another IE type. The description of an IE type must be as generic as possible, i.e., independent of any specific use.

An 'IE description' subclause includes one subclause per IE type.

The description of an IE type is done as a table similar to that used for the description of messages.

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version

The different columns are filled exactly as message description columns are filled.

9.1.3 Extension for further releases

9.1.3.1 Basic principle

Added elements or choice branches are included where they fit most naturally according to their semantics, independently from the version in which they were added.

9.1.3.2 Critical or non-critical

A case by case guideline is provided by informal text after the table itself.

Critical spare values are banned from the tabular. Critical extensions of enumerated must be done by creating a critical extension.

Non critical spare values shall not appear.

The tabular notation shall indicate only that ‘at least one non critical spare value is needed’. The exact number of spare values is found in the transfer syntax.

Non critical spare values are only possible with MD or OP fields (or CV case leading to MD or OP), and an ‘old’ receiver receiving a non critical spare value shall consider it as meaning respectively default value or absence.

9.1.3.3 Topics left unresolved

Other extensions like removing a component, changing the 'Needed' status of a component, changing the 'multiplicity' status of a component (i.e., extending or reducing the range), adding or removing values to an enumerated, extending or reducing the range of a bit or octet string, extending or reducing the range of an integer are FFS.

Whether, and if so how, the tables indicate the critical or non-critical status of the addition in the coding requires FS. One issue is that for an extension within sub-structures (i.e., not a message structure) the status may differ from one message to another.

9.2 Basic types

To reduce the text in tabular descriptions, some basic abstract types of IE are defined in this document.

9.2.1 Enumerated

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version
			Enumerated (*c1*, *c2*, *c3*)		
			Enumerated (x1..*xn*)		

In the first format, *c1*, *c2*, *c3* stands for a list of 2 or more symbolic names separated by commas.

In the second format, *x* is some character string, possibly empty, *n* is an integer, and indicates a list of *n* different values, with no particular property except for being distinct.

This indicates that the value of the IE when present takes one and only one of the values indicated in the list.

9.2.2 Boolean

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version
			Boolean		

This is shorthand for:

			Enumerated (*False, True*)		

The 'semantics description' column should in this case give the meaning of the two alternatives.

NOTE: Boolean should be preferably replaced by an enumerated with two values, with expressive names.

9.2.3 Integer

The type is indicated by the word 'Integer' followed possibly by a list of values or ranges between parentheses.

The different lines below indicate different alternatives.

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version
			Integer	unit indication	
			Integer (*nn..pp*)	unit indication	
			Integer (*nn*..indefinite)	unit indication	
			Integer (*sym1..pp*)	unit indication	
			Integer (*nn..sym2*)	unit indication	
			Integer (*sym1..sym2*)	unit indication	
			Integer (*b1..b2* by step of *st)*	unit indication	

This indicates some quantity of something, possibly limited to some range. This typically enters in computations, such as additions or other arithmetics. The unit should be indicated in the "Semantics description" column when applicable.

Where *nn* and *pp* stand for positive, negative or null integers, and *sym1* and *sym2* for symbolic names.

This corresponds to whole or a subset of the set of positive, negative or null integers, as defined by usual mathematics.

The range notation is self-explanatory. In the two unbounded cases, practical bounds may be imposed by the transfer syntax.

A step indication can be added to any of the range description, meaning that the values are *b1+k*st*, for all integral values of k such that $b1+k*st \leq b2$. The step *st* must be a positive non null integer. When the step indication is not given, the default is a step of 1.

Some care should be applied not to present as Integer a field carrying a type of information which has nothing to do with integer, i.e., used in additions/subtractions, or as a discrete representation of a continuous data. If those conditions are not met, the bit string is to be preferred.

List of values or list of ranges separated by commas can also be used.

The word "indefinite" can also appear as the upper bound of a range, or alone to indicate the infinity as a value. Examples are:

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version
Some element	MP		Integer(0, 10, 20..25)	In dB	
TImer	MD		Integer(100..500 by step of 100, 1000, 2000, indefinite)	In ms, default is 100 Indefinite means that the timer needs not be started	

9.2.4 Bit string

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version
			Bit string (*nn*)		

Where *nn* is a positive non null number indicating the number of bits in the string.

Bit strings are unstructured as seen by the protocol. They are typically transparent fields, used by other protocols (other layers or others systems), or as containers on which bit-per-bit boolean operations are done (e.g., ciphered containers).

9.2.5 Octet string

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version
			Octet string (*nn*)		

Where *nn* is a positive non null number indicating the number of octets in the string.

This is just a shortcut for bit strings with a length a multiple of 8, and the same comments as on bit strings apply.

It should be noted that this does not indicate that the information is 'octet aligned', which is an encoding notion (and hence foreign to the tabular format) according to which in the transfer syntax a field starts at an octet boundary relatively to the beginning of the message (or other container).

9.2.6 Real

The type is indicated by the word 'Real' followed possibly by a list of values or ranges between parentheses.

The different lines below indicate different alternatives.

IE/Group Name	Need	Multi	Type and reference	Semantics description	Version
			Real (by step of *st*)	unit indication	
			Real (*nn*..*pp* by step of *st*)	unit indication	
			Real (*nn*..indefinite by step of *st*)	unit indication	
			Real (*sym1*..*pp* by step of *st*)	unit indication	
			Real (*nn*..*sym2* by step of *st*)	unit indication	
			Real (*sym1*..*sym2* by step of *st*)	unit indication	

This indicates some quantity of something, possibly limited to some range. This typically enters in computations, such as additions or other arithmetics. The unit must be indicated in the 'Semantics description' column when applicable.

Where *nn* and *pp* stand for positive, negative or null reals (typically expressed with a dot or by fractions), and *sym1* and *sym2* for symbolic names.

This corresponds to whole or a subset of the set of positive, negative or null integers, as defined by usual mathematics.

The range notation is self-explanatory. In the two unbounded cases, practical bounds may be imposed by the transfer syntax.

The step indication means that the values are $b1+k*st$, for all integral values of k such that $b1+k*st \leq b2$. The step *st* must be a positive non null real.

List of values or list of ranges separated by commas can also be used.

The word 'indefinite' can also appear as the upper bound of a range, or alone to indicate the infinity as a value.

10.3 Extensions for future releases

10.3.1 Basic principles

All non critical extensions are shown even if empty as it costs no bits.

NOTE : Extensions at component level are left FFS.

10.3.2 Naming convention

If non critical extensions for two different roots happen to be identical in contents, their types are still named differently, possibly with the second being declared as synonymous to the first.

The suffixes "-r3" for Release 99, "-r4" for Release 4 and so on are used to differenciate different releases.

An example is given below to illustrate these principles, on the message named 'test-msg'

```
test-msg-r3 ::= CHOICE {
    r3                              SEQUENCE {
        test-msg-r3                     test-msg-r3-IEs,
        nonCriticalExtensions           SEQUENCE {}
    },
    criticalExtensions              SEQUENCE {}
}

test-msg-r4 ::= CHOICE {
    r3                              SEQUENCE {
        test-msg-r3                     test-msg-r3-IEs,
        test-msg-r3-r4ext               test-msg-r3-r4ext-IEs,
        nonCriticalExtensions           SEQUENCE {}
    },
    r4                              SEQUENCE {
        test-msg-r4                     test-msg-r4-IEs,
        nonCriticalExtensions           SEQUENCE {}
    },
    criticalExtensions              SEQUENCE {}
}

test-msg-r5 ::= CHOICE {
    r3                              SEQUENCE {
        test-msg-r3                     test-msg-r3-IEs,
        test-msg-r3-r4ext               test-msg-r3-r4ext-IEs,
        test-msg-r3-r5ext               test-msg-r3-r5ext-IEs,
        nonCriticalExtensions           SEQUENCE {}
    },
    r4                              SEQUENCE {
        test-msg-r4                     test-msg-r4-IEs,
        test-msg-r4-r5ext               test-msg-r4-r5ext-IEs,
        nonCriticalExtensions           SEQUENCE {}
    },
    r5                              SEQUENCE {
        test-msg-r5                     test-msg-r5-IEs,
        nonCriticalExtensions           SEQUENCE {}
    },
    criticalExtensions              SEQUENCE {}
}
```