

**TSG-RAN Meeting #24**  
**Seoul, Korea, 02-04 June 2004**

**RP-040212**

**Title:** CRs to 25.331 (Rel-5 and associated Rel-6) on Restrict operation of the virtual active set

**Source:** TSG-RAN WG2

**Agenda item:** 7.3.5

<b>Spec</b>	<b>CR</b>	<b>Rev</b>	<b>Phase</b>	<b>Subject</b>	<b>Cat</b>	<b>Version-Current</b>	<b>Version-New</b>	<b>Workitem</b>	<b>Doc-2nd-Level</b>
25.331	2362	-	Rel-5	Restrict operation of the virtual active set	F	5.8.0	5.9.0	TEI5	R2-041265
25.331	2363	-	Rel-6	Restrict operation of the virtual active set	A	6.1.0	6.2.0	TEI5	R2-041266

## CHANGE REQUEST

# 25.331 CR 2362 # rev - # Current version: 5.8.0 #

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  Radio Access Network  Core Network

<b>Title:</b>	# Restrict operation of the virtual active set		
<b>Source:</b>	# RAN WG2		
<b>Work item code:</b>	# TEI5	<b>Date:</b>	# May/2004
<b>Category:</b>	# <b>F</b>	<b>Release:</b>	# Rel-5
	Use <u>one</u> of the following categories: <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		Use <u>one</u> 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)

<b>Reason for change:</b>	# The specification of the virtual active set is considered to be over complicated and poorly specified, this has created many problems with different interpretations being possible. The functionality is becoming increasingly complex with no significant benefit.  To simplify the operation of the virtual active set it is proposed to restrict the operation of the virtual active set to the following features only: <ol style="list-style-type: none"> <li>1. Permit one virtual active set per non-used frequency (This was the original intention)</li> <li>2. Permit UE autonomous update mode "on with no reporting" as the only method for initialising and updating the virtual active set</li> <li>3. Use the intra-frequency reporting criteria signalled in a separate intra-frequency measurement</li> </ol> This will effectively remove the following features: <ol style="list-style-type: none"> <li>1. Any ambiguity on the definition of a virtual active set.</li> <li>2. UE autonomous update mode "on" and "off"</li> <li>3. Signalling intra-frequency reporting criteria in an inter-frequency measurement</li> </ol>
<b>Summary of change:</b>	# Remove all references to obsolete functionality in sections...  8.4.1.3 Reception of MEASUREMENT CONTROL by the UE Remove references to modifying "intra-frequency reporting criteria" and "intra-frequency measurement reporting criteria" for an inter-frequency measurement.

- 8.6.7.14 Inter-frequency measurement  
Added statement that the UE behaviour is unspecified if it receives an inter-frequency measurement with intra-frequency events specified.
- 10.3.7.16 Inter-frequency measurement  
Remove reference to inter-frequency set update  
Remove references to signalling intra-frequency reporting criteria
- 10.3.7.18 Inter-frequency measurement quantity  
Remove references to signalling intra-frequency reporting criteria
- 10.3.7.22 Inter-frequency SET UPDATE  
Removed all options **not** related to UE autonomous mode on with no reporting.
- 14.2.1 Inter-frequency reporting events  
Remove references to signalling intra-frequency reporting criteria
- 14.11 UE autonomous update of virtual active set on non-used frequency (FDD only)  
Remove references to signalling intra-frequency reporting criteria
- 14.11.1 Initial virtual active set  
Remove references to UE autonomous update mode "on" and "off"
- 14.11.2 Virtual active set update during an inter-frequency measurement  
Remove references to signalling intra-frequency reporting criteria  
Remove references to UE autonomous update mode "on" and "off"

**Impact Analysis:**

This CR is effectively reducing the UE requirements therefore there should not be hardly any UE impact.  
This CR would impact a UTRAN that is currently attempting to use the VAS modes being removed. However, it was a working assumption in RAN2 that no UTRAN is currently using the removed functionality. Furthermore, it would be practically impossible to use the removed functionality since it was agreed it is not working.

**Consequences if not approved:** ☹ The listed functionalities above do not work. Therefore, unnecessary UE requirements will be kept in the specification. Significant changes and increase in complexity will be required in order to correct the removed functionality.

**Clauses affected:** ☹

	Y	N		☹
<b>Other specs affected:</b>			Other core specifications	
			Test specifications	
			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.

### 8.4.1.3 Reception of MEASUREMENT CONTROL by the UE

Upon reception of a MEASUREMENT CONTROL message the UE shall perform actions specified in subclause 8.6 unless otherwise specified below.

The UE shall:

- 1> read the IE "Measurement command";
- 1> if the IE "Measurement command" has the value "setup":
  - 2> store this measurement in the variable MEASUREMENT\_IDENTITY according to the IE "measurement identity", first releasing any previously stored measurement with that identity if that exists;
  - 2> if the measurement type is quality, UE internal, intra-frequency, inter-frequency or inter-RAT:
    - 3> if the UE is in CELL\_FACH state:
      - 4> the UE behaviour is not specified.
    - 2> for measurement types "inter-RAT measurement" or "inter-frequency measurement" that require measurements on a frequency other than the actually used frequency:
      - 3> if, according to its measurement capabilities, the UE requires compressed mode to perform that measurement type and after reception of this message a compressed mode pattern sequence with an appropriate measurement purpose is active according to the IE "Current TGPS Status Flag" in UE variable TGPS\_IDENTITY; or
      - 3> if, according to its measurement capabilities, the UE does not require compressed mode to perform the measurements on at least one supported band of that measurement type:
        - 4> if the measurement is valid in the current RRC state of the UE:
          - 5> begin measurements according to the stored control information for this measurement identity.

NOTE: The UE is not required to perform measurements on cells for which it needs compressed mode but a suitable compressed mode pattern is not activated.

- 2> for measurement type "inter-frequency measurement" that requires measurements only on the same frequency as the actually used frequency:
  - 3> if the measurement is valid in the current RRC state of the UE:
    - 4> begin measurements according to the stored control information for this measurement identity.
- 2> for measurement type "UE positioning measurement":
  - 3> if the UE is in CELL\_FACH state:
    - 4> if IE "Positioning Method" is set to "OTDOA":
      - 5> if IE "Method Type" is set to "UE assisted":
        - 6> if IE "UE positioning OTDOA assistance data for UE assisted" is not included:
          - 7> if System Information Block type 15.4 is broadcast:
            - 8> read System Information Block type 15.4.
          - 7> act as specified in subclause 8.6.7.19.2.
      - 5> if IE "Method Type" is set to "UE based":
        - 6> if IE "UE positioning OTDOA assistance data for UE based" is not included:
          - 7> if System Information Block type 15.5 is broadcast:

- 8> read System Information Block type 15.5.
- 7> act as specified in subclause 8.6.7.19.2a.
- 2> for any other measurement type:
  - 3> if the measurement is valid in the current RRC state of the UE:
    - 4> begin measurements according to the stored control information for this measurement identity.
- 1> if the IE "Measurement command" has the value "modify":
  - 2> for all IEs present in the MEASUREMENT CONTROL message:
    - 3> if a measurement was stored in the variable MEASUREMENT\_IDENTITY associated to the identity by the IE "measurement identity":
      - 4> if the measurement type is quality, UE internal, intra-frequency, inter-frequency or inter-RAT:
        - 5> if the UE is in CELL\_FACH state:
          - 6> the UE behaviour is not specified.
      - 4> if measurement type is set to "intra-frequency measurement", for any of the optional IEs "Intra-frequency measurement objects list", "Intra-frequency measurement quantity", "Intra-frequency reporting quantity", "Measurement Validity", "report criteria" and "parameters required for each event" (given "report criteria" is set to "intra-frequency measurement reporting criteria") that are present in the MEASUREMENT CONTROL message:
      - 4> if measurement type is set to "inter-frequency measurement", for any of the optional IEs "Inter-frequency measurement quantity", "Inter-frequency reporting quantity", "Measurement Validity", "Inter-frequency set update" and "parameters required for each event" (given "report criteria" is set to either "inter-frequency measurement reporting criteria" or "intra-frequency measurement reporting criteria") that are present in the MEASUREMENT CONTROL message:
      - 4> if measurement type is set to "inter-RAT measurement", for any of the optional IEs "Inter-RAT measurement objects list", "Inter-RAT measurement quantity", "Inter-RAT reporting quantity" and "parameters required for each event" (given "report criteria" is set to "inter-RAT measurement reporting criteria") that are present in the MEASUREMENT CONTROL message:
      - 4> if measurement type is set to "UE positioning measurement" and the IE "UE positioning OTDOA assistance data" is present, for any of the optional IEs "UE positioning OTDOA neighbour cell info for UE-assisted", "UE positioning OTDOA reference cell info for UE-assisted", "UE positioning OTDOA reference cell info for UE-based", "UE positioning OTDOA neighbour cell info for UE-based" and "UE positioning" that are present in the MEASUREMENT CONTROL message:
      - 4> if measurement type is set to "UE positioning measurement" and the IE "UE positioning GPS assistance data" is present, for any of the optional IEs "UE positioning GPS reference time", "UE positioning GPS reference UE position", "UE positioning GPS DGPS corrections", "UE positioning GPS ionospheric model", "UE positioning GPS UTC model", "UE positioning GPS acquisition assistance", "UE positioning GPS real-time integrity" that are present in the MEASUREMENT CONTROL message:
      - 4> if measurement type is set to "traffic volume measurement", for any of the optional IEs "Traffic volume measurement Object", "Traffic volume measurement quantity", "Traffic volume reporting quantity", "Measurement Validity" and "parameters required for each event" (given "report criteria" is set to "traffic volume measurement reporting criteria") that are present in the MEASUREMENT CONTROL message:
      - 4> if measurement type is set to "quality measurement", for any of the optional IE "Quality reporting quantity" that is present in the MEASUREMENT CONTROL message:
      - 4> if measurement type is set to "UE internal measurement", for any of the optional IEs "UE internal measurement quantity", "UE internal reporting quantity" and "parameters required for each event" (given "report criteria" is set to "UE internal measurement reporting criteria") that are present in the MEASUREMENT CONTROL message:

- 5> replace all instances of the IEs listed above (and all their children) stored in variable MEASUREMENT\_IDENTITY associated to the identity indicated by the IE "measurement identity" with the IEs received in the MEASUREMENT CONTROL message;
  - 5> leave all other stored information elements unchanged in the variable MEASUREMENT\_IDENTITY.
- 3> otherwise:
- 4> set the variable CONFIGURATION\_INCOMPLETE to TRUE.
- 2> if measurement type is set to "inter-frequency measurement":
- 3> if "report criteria" is set to "intra-frequency measurement reporting criteria" and "reporting criteria" in "inter-frequency measurement quantity" is set to "intra-frequency reporting criteria":
    - 4> if IE "Parameters required for each event" is included:
      - 5> leave the currently stored "inter-frequency measurement reporting criteria" within "report criteria" and "inter-frequency reporting criteria" within "inter-frequency measurement quantity" unchanged, and continue to act on the information stored in these variables, ~~and also store the newly received "intra-frequency measurement reporting criteria" and "intra-frequency reporting criteria".~~
    - 4> otherwise:
      - 5> ~~leave the currently stored "inter-frequency measurement reporting criteria" and "intra-frequency measurement reporting criteria" within "report criteria" and "inter-frequency reporting criteria" within "inter-frequency measurement quantity" unchanged, and continue to act on the information stored in these variables, and also store the newly received "intra-frequency reporting criteria".~~
  - 3> otherwise:
    - 4> ~~clear the variables associated with the CHOICE "report criteria" and store the received "report criteria" choice;~~
    - 4> if the IE "inter-frequency measurement quantity" is present:
      - 5> ~~clear the variables associated with the choice "reporting criteria" in "inter-frequency measurement quantity" and store the received "reporting criteria" choice.~~
- NOTE:** If the UTRAN wants to modify the inter-frequency cell info list for an inter-frequency measurement configured with event based reporting without repeating any IEs related to the configured events, ~~the only one~~ possibility is to set the IE "report criteria" to "intra-frequency measurement reporting criteria", not include the IE "parameters required for each event", and set the IE "reporting criteria" in the IE "inter-frequency measurement quantity" to "intra-frequency reporting criteria".
- 2> for measurement types "inter-frequency measurement" that require measurements on a frequency other than the actually used frequency, or that require measurements on another RAT:
    - 3> if, according to its measurement capabilities, the UE requires compressed mode to perform that measurement type and after reception of this message a compressed mode pattern sequence with an appropriate measurement purpose is active according to the IE "Current TGPS Status Flag" in UE variable TGPS\_IDENTITY; or
    - 3> if, according to its measurement capabilities, the UE does not require compressed mode, on at least one supported band of that measurement type, to perform the measurements:
      - 4> resume the measurements according to the new stored measurement control information.
  - 2> for measurement type "inter-frequency measurement" that requires measurements only on the same frequency as the actually used frequency:
    - 3> if the measurement is valid in the current RRC state of the UE:
      - 4> resume measurements according to the new stored control information for this measurement identity.

- 2> for any other measurement type:
    - 3> resume the measurements according to the new stored measurement control information.
  - 1> if the IE "measurement command" has the value "release":
    - 2> terminate the measurement associated with the identity given in the IE "measurement identity";
    - 2> clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT\_IDENTITY.
  - 1> if the IE "DPCH Compressed Mode Status Info" is present:
    - 2> if, as the result of this message, UE will have more than one transmission gap pattern sequence with the same measurement purpose active (according to IE 'TGMP' in variable TGPS\_IDENTITY):
      - 3> set the variable CONFIGURATION\_INCOMPLETE to TRUE.
    - 2> if there is any pending "TGPS reconfiguration CFN" or any pending "TGCFN":
      - 3> the UE behaviour is unspecified;
    - 2> if pattern sequence corresponding to IE "TGPSI" is already active (according to "Current TGPS Status Flag") in the variable TGPS\_IDENTITY):
      - 3> if the "TGPS Status Flag" in this message is set to "deactivate" for the corresponding pattern sequence:
        - 4> deactivate this pattern sequence at the beginning of the frame indicated by IE "TGPS reconfiguration CFN" received in the message;
        - 4> set the "Current TGPS Status Flag" for this pattern sequence in the variable TGPS\_IDENTITY to "inactive".
      - 3> if the "TGPS Status Flag" in this message is set to "activate" for the corresponding pattern sequence:
        - 4> deactivate this pattern sequence at the beginning of the frame indicated by IE "TGPS reconfiguration CFN" received in the message.
- NOTE: The temporary deactivation of pattern sequences for which the status flag is set to "activate" can be used by the network to align the timing of already active patterns with newly activated patterns.
- 2> after the time indicated by IE "TGPS reconfiguration CFN" has elapsed:
    - 3> activate the pattern sequence corresponding to each IE "TGPSI" for which the "TGPS status flag" in this message is set to "activate" at the time indicated by IE "TGCFN"; and
    - 3> set the corresponding "Current TGPS status flag" for this pattern sequence in the variable TGPS\_IDENTITY to "active"; and
    - 3> begin the inter-frequency and/or inter-RAT measurements corresponding to the pattern sequence measurement purpose of each activated pattern sequence;
    - 3> if the values of IE "TGPS reconfiguration CFN" and IE "TGCFN" are equal:
      - 4> start the concerned pattern sequence immediately at that CFN.
  - 2> not alter pattern sequences stored in variable TGPS\_IDENTITY, if the pattern sequence is not identified in IE "TGPSI" in the received message.
- 1> if the UE in CELL\_FACH state receives a MEASUREMENT CONTROL message, which indicates the same measurement identity as that stored in the variable MEASUREMENT\_IDENTITY:
    - 2> update the stored information with the traffic volume measurement control information in variable MEASUREMENT\_IDENTITY; and
    - 2> refrain from updating the traffic volume measurement control information associated with this measurement identity in the variable MEASUREMENT\_IDENTITY with the information received in System Information



Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11) until this measurement is explicitly released with another MEASUREMENT CONTROL message.

- 1> if the IE "Read SFN indicator" included in the IE "Cell info" of an inter-frequency cell is set to TRUE and the variable UE\_CAPABILITY\_TRANSFERRED has the DL "Measurement capability" for "FDD measurements" set to TRUE (the UE requires DL compressed mode in order to perform measurements on FDD):
  - 2> set the variable CONFIGURATION\_INCOMPLETE to TRUE.
- 1> clear the entry for the MEASUREMENT CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS.

The UE may:

- 1> if the IE "Measurement command" has the value "setup":
  - 2> for measurement type "UE positioning measurement":
    - 3> if the UE is CELL\_FACH state:
      - 4> if IE "Positioning Method" is set to "GPS":
        - 5> if IE "UE positioning GPS assistance data" is not included and variable UE\_POSITIONING\_GPS\_DATA is empty:
          - 6> if System Information Block types 15, 15.1, 15.2 and 15.3 are broadcast:
            - 7> read System Information Block types 15, 15.1, 15.2 and 15.3.
          - 6> act as specified in subclause 8.6.7.19.3.
- 1> and the procedure ends.

#### 8.6.7.14 Inter-frequency measurement

If the Inter-frequency cell info list, included in the variable CELL\_INFO\_LIST, includes a number (M) of frequencies that is larger than the number (N) considered in a UE performance requirement defined in [19] and [20]:

- 1> the UE shall:
  - 2> meet this performance requirement on the first relevant (N) frequencies, according to the order defined by the position of the frequencies in the Inter-frequency cell info list, included in the variable CELL\_INFO\_LIST.
- 1> the UE may:
  - 2> ignore the remaining (M-N) frequencies.

If IE "Inter-frequency measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "Inter-frequency measurement quantity", IE "Inter-frequency reporting quantity" or IE "parameters required for each event" (given "CHOICE Report criteria" is set to "inter-frequency measurement reporting criteria" ~~or "intra-frequency measurement reporting criteria"~~) is not received, the UE shall:

- 1> clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT\_IDENTITY;
- 1> set the variable CONFIGURATION\_INCOMPLETE to TRUE.;

If IE "Inter-frequency measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "modify":

- 1> if CHOICE "Report criteria" in IE "Inter-frequency measurement" is set to "intra-frequency reporting criteria" and IE "parameters required for each event" is present:
  - 2> the UE behaviour is unspecified.

If IE "Inter-frequency measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup" and CHOICE "Report criteria" is set to "intra-frequency reporting criteria" in IE "Inter-frequency measurement":

1> the UE behaviour is unspecified.

In the case of an inter-frequency measurement for FDD, the UE shall:

1> if IE "Inter-frequency measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", if an inter-frequency event is configured that is different from event 2d or 2f, and if the IE "Inter-frequency SET UPDATE" is not received in that same message:

2> set the variable CONFIGURATION\_INCOMPLETE to TRUE.

~~1> if the IE "Inter-frequency SET UPDATE" is received:~~

~~2> if the value of the IE "UE autonomous update mode" set to "Off" or "On":~~

~~3> if more than one frequency is included in the list of cells pointed at in the IE "cells for measurement" if also included in the same IE "Inter-frequency measurement", or otherwise included in the "Inter-frequency cell info" part of the variable CELL\_INFO\_LIST:~~

~~4> set the variable CONFIGURATION\_INCOMPLETE to TRUE.~~

If IE "Inter-frequency measurement" is received by the UE in a MEASUREMENT CONTROL message:

1> if CHOICE "Report criteria" is set to "inter-frequency measurement reporting criteria" and CHOICE "reporting criteria" in "inter-frequency measurement quantity" is not set to "inter-frequency reporting criteria"; or

1> if CHOICE "Report criteria" is set to "intra-frequency measurement reporting criteria" and CHOICE "reporting criteria" in "inter-frequency measurement quantity" is not set to "intra-frequency reporting criteria":

2> the UE behaviour is not specified.

If the variable CONFIGURATION\_INCOMPLETE is set to TRUE, the UE shall:

1> act as described in subclause 8.4.1.4a.

### 10.3.7.16 Inter-frequency measurement

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Inter-frequency measurement objects list	MP		Inter-frequency cell info list 10.3.7.13	
Inter-frequency measurement quantity	OP		Inter-frequency measurement quantity 10.3.7.18	
Inter-frequency reporting quantity	OP		Inter-frequency reporting quantity 10.3.7.21	
Reporting cell status	CV-reporting		Reporting cell status 10.3.7.61	
Measurement validity	OP		Measurement validity 10.3.7.51	
Inter-frequency set update	OP		Inter-frequency set update 10.3.7.22	
CHOICE report criteria	MP			

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>Intra-frequency measurement reporting criteria			Intra-frequency measurement reporting criteria 10.3.7.39	
>Inter-frequency measurement reporting criteria			Inter-frequency measurement reporting criteria 10.3.7.19	
>Periodical reporting criteria			Periodical reporting criteria 10.3.7.53	
>No reporting				(no data) Chosen when this measurement only is used as additional measurement to another measurement

Condition	Explanation
<i>Reporting</i>	This IE is optional if the CHOICE " <i>report criteria</i> " is equal to "periodical reporting criteria" or "No reporting", otherwise the IE is not needed

### 10.3.7.18 Inter-frequency measurement quantity

The quantity the UE shall measure in case of inter-frequency measurement. It also includes the filtering of the measurements.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE <i>reporting criteria</i>	MP			
>Intra-frequency reporting criteria				
>>Intra-frequency measurement quantity	MP		Intra-frequency measurement quantity 10.3.7.38	
>Inter-frequency reporting criteria				
>>Filter coefficient	MP		Filter coefficient 10.3.7.9	
>>>CHOICE <i>mode</i>	MP			
>>>>FDD				
>>>>>Measurement quantity for frequency quality estimate	MP		Enumerated(CPICH, Ec/N0, CPICH, RSCP)	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>>>TDD				
>>>>Measurement quantity for frequency quality estimate	MP		Enumerated( Primary CCPCH RSCP)	

**10.3.7.22 Inter-frequency SET UPDATE**

NOTE 1: Only for FDD.

~~Contains the changes of the virtual active set associated with a non-used frequency. This information makes it possible to use events defined for Intra-frequency measurement within the same non-used frequency for Inter-frequency measurement reporting criteria. This information also controls if the UE should use autonomous updating of the virtual active set associated with a non-used frequency.~~

Information Element/group name	Need	Multi	Type and reference	Semantics description
UE autonomous update mode	MP		Enumerated (On, On with no reporting, Off)	Required for backwards compatibility with a UE not supporting this revision of the standard
<del>Non-autonomous update mode</del>	<del>CV-Update</del>			
<del>&gt;Radio link addition information</del>	<del>OP</del>	<del>1 to &lt;maxRL&gt;</del>		<del>Radio link addition information required for each RL to add</del>
<del>&gt;&gt;Primary CPICH info</del>	<del>MP</del>		<del>Primary CPICH info 10.3.6.60</del>	<del>NOTE 2</del>
<del>&gt;Radio link removal information</del>	<del>OP</del>	<del>1 to &lt;MaxRL&gt;</del>		<del>Radio link removal information required for each RL to remove</del>
<del>&gt;&gt;Primary CPICH info</del>	<del>MP</del>		<del>Primary CPICH info 10.3.6.60</del>	<del>NOTE 2</del>

Condition	Explanation
<del>Update</del>	<del>The IE is mandatory present if the IE "UE autonomous update mode" is set to "Off", otherwise the IE is not needed.</del>

~~NOTE 2: If it is assumed that CPICH downlink scrambling code is always allocated with sufficient reuse distances, CPICH downlink scrambling code will be enough for designating the different radio links.~~

**14.2.1 Inter-frequency reporting events**

Within the measurement reporting criteria field in the MEASUREMENT CONTROL message UTRAN notifies the UE which events should trigger the UE to send a MEASUREMENT REPORT message. The listed events are the toolbox from which the UTRAN can choose the reporting events that are needed for the implemented handover evaluation function, or other radio network functions.

All events are evaluated with respect to one of the measurement quantities given in subclause 14.2.0a. The measurement quantities are measured on the monitored primary common pilot channels (CPICH) in FDD mode and the monitored primary common control channels (PCCPCH) in TDD mode of the cell defined in the measurement object. A "non-used frequency" is a frequency that the UE has been ordered to measure upon but is not used for the connection. A "used frequency" is a frequency that the UE has been ordered to measure upon and is also currently used for the connection.

The "monitored set on non-used frequency" consists of cells in "cells for measurement" (or all cells in CELL\_INFO\_LIST if "cells for measurement" is not present) that are not part of the virtual active set on that non-used frequency.

When one inter-frequency measurement identity corresponds to multiple ~~intra-frequency or~~ inter-frequency events with identical event identities, the UE behaviour is not specified.

## 14.11 UE autonomous update of virtual active set on non-used frequency (FDD only)

In the text that follows:

- a "non-used frequency" is a frequency that the UE has been ordered to measure upon but is not used for the connection. A "used frequency" is a frequency that the UE has been ordered to measure upon and is also currently used for the connection;
- a "non-used frequency (resp. cell) considered in an inter-frequency measurement" shall be understood as a non-used frequency (resp. cell) included in the list of cells pointed at in the IE "cells for measurement" if it was received for that measurement, or otherwise as a non-used frequency (resp. cell) included in the "Inter-frequency cell info" part of the variable CELL\_INFO\_LIST.

For event-triggered inter frequency measurements it is possible to ~~specify~~ ~~use~~ intra-frequency measurements reporting events for support of maintenance of an active set associated with a non-used frequency considered in that measurement, a "virtual active set" and used in the evaluation of the frequency quality estimates. The "initial virtual active set" for a frequency is the virtual active set that is associated to that frequency just after a message was received that sets up or modifies the inter-frequency measurement.

The way the virtual active sets are initiated and updated for the non-used frequencies considered in an inter-frequency measurement is described in the two subclauses below, ~~and depends on whether the IE "intra-frequency reporting criteria" is stored for the inter-frequency measurement or not. In case that IE is not stored, the IE "intra-frequency measurement" stored in other measurements of type intra-frequency shall be used.~~

~~The UE shall support a single virtual active set per non-used frequency. The UE shall support 2 non-used frequencies.~~

### 14.11.1 Initial virtual active set

If the UE receives a MEASUREMENT CONTROL message that sets up or modifies an inter-frequency measurement and includes the IE "Inter-frequency set update", the UE shall:

- ~~1> if the IE "Intra-Frequency measurement reporting criteria" and the IE "Parameters required for each event" is included in the MEASUREMENT CONTROL message; or~~
- ~~1> if the IE "Intra-Frequency measurement reporting criteria" including the IE "Parameters required for each event" are stored for this measurement in the variable MEASUREMENT\_IDENTITY;~~
- ~~2> if the IE "UE autonomous update mode" is set to "on" or "on with no reporting";~~
- ~~3> for each non-used frequency  $F_i$  considered in the measurement:~~
  - ~~4> include in the initial virtual active set the  $N_i$  cells that have either the greatest downlink  $E_c/N_0$ , the greatest downlink RSCP after despreading, or the lowest pathloss (depending on what is indicated in the IE "inter-frequency measurement quantity"), among the cells on frequency  $F_i$  considered in that inter-frequency measurement, where:~~
  - ~~5> if event 1a is configured in the "Intra-Frequency measurement reporting criteria":~~

~~$$N_i = \min(N_{1a}, N_{Cells\ F_i}) \text{ if } N_{1a} \neq 0 \text{ and } N_i = N_{Cells\ F_i} \text{ otherwise.}$$~~

~~— where:~~

—  $N_{Ia}$  is the "Reporting deactivation threshold" included in the "Intra-Frequency measurement" IE received for that inter-frequency measurement for event 1a.

—  $N_{Cells Fi}$  is the number of cells on frequency  $F_i$  considered in that inter-frequency measurement.

5> else:

$$\underline{N_i = N_{Cells Fi}}$$

— where:

—  $N_{Cells Fi}$  is the number of cells on frequency  $F_i$  considered in that inter-frequency measurement.

2> if the IE "UE autonomous update mode" is set to "on":

3> if event 1a is configured in the "Intra-Frequency measurement reporting criteria":

4> send a MEASUREMENT REPORT with IEs set as follows:

5> set the Measurement identity to the identity of the inter-frequency measurement;

5> set the CHOICE event result in the IE Event results to Intra-frequency measurement event results, Intra-frequency event identity to 1a, and in "Cell measurement event results" the CPICH info of all the cells included in a virtual active set of the non-used frequency considered in the inter-frequency measurement;

5> do not include the IEs "measured results" or "additional measured results".

2> if the IE "UE autonomous update mode" is set to "Off":

3> if the IE "Measurement command" is set to "Modify", if the value previously stored for the IE "UE autonomous update mode" was also "Off":

4> apply the modifications indicated in the "Inter-frequency set update" to the virtual active set that was valid before the message was received for the non-used frequency considered in that inter-frequency measurement.

3> otherwise:

4> remove the possibly existing virtual active set of the non-used frequency considered in that measurement; and

4> set the initial virtual active set for it according to the "Inter-frequency set update" included in the message.

1> if the IE "Intra-Frequency measurement reporting criteria" and the IE "Parameters required for each event" were not included in the MEASUREMENT CONTROL message; and

1> the IE "Intra-Frequency measurement reporting criteria" including the IE "Parameters required for each event" are not stored for this measurement in the variable MEASUREMENT\_IDENTITY:

2> if the IE "UE autonomous update mode" is set to "on" or "on with no reporting":

31> for each non-used frequency  $F_i$  considered in the measurement:

42> include in the initial virtual active set the  $N_i$  cells that have either the greatest downlink  $E_c/N_0$  or the greatest downlink RSCP after despreading or the lowest pathloss (depending on what is indicated in the IE "inter-frequency measurement quantity"), among the cells on frequency  $F_i$  considered in that inter-frequency measurement, where:

53> if event 1a is configured for the used frequency in an intra-frequency measurement:

$$\underline{N_i = \min(N_{Ia}, N_{Cells Fi})} \text{ if } N_{Ia} \neq 0 \text{ and } \underline{N_i = N_{Cells Fi}} \text{ otherwise.}$$

where:

$N_{1a}$  is the "Reporting deactivation threshold" included in the intra-frequency measurement for the first event 1a defined in the intra-frequency measurement with the lowest identity.

$N_{Cells F_i}$  is the number of cells on frequency  $F_i$  considered in that inter-frequency measurement.

~~53~~> else:

$$N_i = N_{Cells F_i}$$

where:

$N_{Cells F_i}$  is the number of cells on frequency  $F_i$  considered in that inter-frequency measurement.

~~3~~> if the IE "UE autonomous update mode" is set to "on":

~~4~~> if event 1a is configured for the used frequency in an intra-frequency measurement:

~~5~~> send a measurement report with IEs set as follows:

~~6~~> set the Measurement identity to the identity of the inter-frequency measurement;

~~6~~> set the CHOICE event result in the IE Event results to Intra-frequency measurement event results, Intra-frequency event identity to 1a, and in "Cell measurement event results" the CPICH info of all the cells included in the initial virtual active set of the non-used frequency considered in that measurement;

~~6~~> do not include the IEs "measured results" or "additional measured results".

~~2~~> if the IE "UE autonomous update mode" is set to "off":

~~3~~> if the IE "Measurement command" is set to "Modify", if the value previously stored for the IE "UE autonomous update mode" was also "Off":

~~4~~> apply the modifications indicated in the "Inter-frequency set update" to the virtual active set that was valid before the message was received for the non-used frequency considered in that inter-frequency measurement.

~~3~~> otherwise:

~~4~~> remove the possibly-existing virtual active set of the non-used frequency considered in that measurement; and

~~4~~> set the initial virtual active set for it according to the "Inter-frequency set update" included in the message.

## 14.11.2 Virtual active set update during an inter-frequency measurement

If the IE "Intra-frequency measurement reporting criteria" is stored for an inter-frequency measurement and Event 1A is configured, the UE shall:

~~1~~> when Event 1a is triggered by a cell for a non-used frequency considered in that measurement (according to the criteria described in subclause 14.1.2.1):

~~2~~> if the "Reporting deactivation threshold" is equal to 0, or if the "Reporting deactivation threshold" is different from 0 and the number of cells included in the virtual active set for that frequency is less than or equal to the "Reporting deactivation threshold":

~~3~~> if the IE "UE autonomous update mode" is set to "on" or "on with no reporting":

~~4~~> add the primary CPICH that enters the reporting range to the "virtual active set".

~~3~~> if the IE "UE autonomous update mode" is set to "on" or "off":

- 4> send a measurement report with IEs set as below:
  - 5> set the Measurement identity to the identity of the inter-frequency measurement;
  - 5> set the CHOICE event result in the IE Event results to Intra-frequency measurement event results, Intra-frequency event identity to 1a, and in "Cell measurement event results" the CPICH info of the cell that triggered the event;
  - 5> do not include the IEs "measured results" or "additional measured results".
- 1> if Event 1b was configured, when this event is triggered by a cell for a non-used frequency considered in that measurement (according to the criteria described in subclause 14.1.2.2):
  - 2> if the IE "UE autonomous update mode" is set to "on" or "on with no reporting" and if the number of cells included in the virtual active set is greater than 1:
    - 3> remove the primary CPICH that leaves the reporting range from the "virtual active set".
  - 2> if the IE "UE autonomous update mode" is set to "on" or "off":
    - 3> send a measurement report with IEs set as below:
      - 4> set the Measurement identity to the identity of the inter-frequency measurement;
      - 4> set the CHOICE event result in the IE Event results to Intra-frequency measurement event results, Intra-frequency event identity to 1b, and in "Cell measurement event results" the CPICH info of the cell that triggered the event;
      - 4> do not include the IEs "measured results" or "additional measured results".
- 1> if Event 1c was configured, when this event is triggered by a cell for a non-used frequency considered in that measurement (according to the criteria described in subclause 14.1.2.3):
  - 2> if the "Reporting activation threshold" is equal to 0, or if the "Reporting activation threshold" is different from 0 and the number of cells included in the virtual active set for that frequency is greater than or equal to the "Reporting activation threshold":
    - 3> if the IE "UE autonomous update mode" is set to "on" or "on with no reporting":
      - 4> rank all active and non-active primary CPICHs and take the  $n$  best cells to create a new "virtual active set", where  $n$  is the number of active primary CPICHs in the "virtual active set".
    - 3> if the IE "UE autonomous update mode" is set to "on" or "off":
      - 4> send a measurement report with IEs set as below:
        - 5> set the Measurement identity to the identity of the inter-frequency measurement;
        - 5> set the CHOICE event result in the IE Event results to Intra-frequency measurement event results, Intra-frequency event identity to 1c, and in "Cell measurement event results" include the CPICH info of all the cells that satisfy the event, and the rest of the entries as the cells that were in the virtual active set before the event occurred and that are worse than the best cell that triggered the event, in the order of their measured value (best one first);
        - 5> do not include the IEs "measured results" or "additional measured results".

If the IE "Intra-frequency measurement reporting criteria" is stored for an inter-frequency measurement, the IE "UE autonomous update mode" is set to "on" or "on with no reporting":

- 1> if event 1a is not configured:
  - 2> the UE shall continuously update the virtual active set to consist of all cells on frequency  $F_i$  considered in that inter-frequency measurement, without sending any corresponding measurement report.

If the IE "Intra-frequency measurement reporting criteria" is not stored for that For an inter-frequency measurement, the UE shall:



- 1> apply the events of type 1a, 1b and 1c that were defined for the used frequency in other stored measurements of type "intra-frequency" at the time the inter-frequency measurement was set up; and
- 1> update the virtual active set for the non-used frequencies considered in that measurement according to the following rules:
  - 2> if several events of type 1a (resp. 1b,1c) were defined for the used frequency when the inter-frequency measurement was set up, only the first 1a event (resp 1b, 1c) that was defined in the measurement with the lowest measurement identity shall apply to the non-used frequencies;
  - 2> all the cells considered in the inter-frequency measurements shall be able to affect the reporting range for event 1a and 1b. (i.e. the IE "Cells forbidden to affect reporting range" possibly stored for the intra-frequency measurements on the used frequency does not apply to the non-used frequencies considered in the inter-frequency measurement);
  - 2> the IEs "amount of reporting" and "reporting interval" that were stored for the intra-frequency measurements on the used frequency shall not be considered if reports of the virtual active set updates are needed.
- 1> if event 1a is applicable to the non-used frequencies considered in the inter-frequency measurement:
  - 2> when this event is triggered (according to the criteria described in subclause 14.1.2.1) by a cell for a non-used frequency considered in that measurement:
    - 3> if the "Reporting deactivation threshold" is equal to 0, or if the "Reporting deactivation threshold" is different from 0 and the number of cells included in the virtual active set for that frequency is less than or equal to the "Reporting deactivation threshold":
      - 4> ~~if the IE "UE autonomous update mode" is set to "on" or "on with no reporting":~~
        - 5> ~~add the primary CPICH that enters the reporting range to the "virtual active set".~~
      - 4> ~~if the IE "UE autonomous update mode" is set to "on" or "off" send a measurement report with IEs set as below:~~
        - 5> ~~set the Measurement identity to the identity of the inter frequency measurement;~~
        - 5> ~~set the CHOICE event result in the IE Event results to Intra frequency measurement event results, Intra frequency event identity to 1a, and in "Cell measurement event results" the CPICH info of the cell that triggered the event;~~
        - 5> ~~do not include the IEs "measured results" or "additional measured results".~~
  - 2> if event 1b is applicable for the non-used frequencies considered in that inter-frequency measurement, when this event is triggered (according to the criteria described in subclause 14.1.2.2) by a cell for a non-used frequency considered in that measurement:
    - 3> ~~if the IE "UE autonomous update mode" is set to "on" or "on with no reporting" and~~ if the number of cells included in the virtual active set is greater than 1:
      - 4> remove the primary CPICH that leaves the reporting range from the "virtual active set".
    - 3> ~~if the IE "UE autonomous update mode" is set to "on" or "off", send a measurement report with IEs set as below:~~
      - 4> ~~set the Measurement identity to the identity of the inter frequency measurement;~~
      - 4> ~~set the CHOICE event result in the IE Event results to Intra frequency measurement event results, Intra frequency event identity to 1b, and in "Cell measurement event results" the CPICH info of the cell that triggered the event;~~
      - 4> ~~do not include the IEs "measured results" or "additional measured results".~~
- 2> if event 1c is applicable for the non-used frequencies considered in that inter-frequency measurement, when this event is triggered (according to the criteria described in subclause 14.1.2.3) by a cell for a non-used frequency considered in that measurement:

3> if the "Reporting activation threshold" is equal to 0, or if the "Reporting activation threshold" is different from 0 and the number of cells included in the virtual active set for that frequency is greater than or equal to the "Reporting activation threshold":

4> ~~if the IE "UE autonomous update mode" is set to "on" or "on with no reporting":~~

~~5> rank all active and non-active primary CPICHs and take the  $n$  best cells to create a new "virtual active set", where  $n$  is the number of active primary CPICHs in the "virtual active set".~~

~~4> if the IE "UE autonomous update mode" is set to "on" or "off" send a measurement report with IEs set as below:~~

~~5> set the Measurement identity to the identity of the inter-frequency measurement.~~

~~5> set the CHOICE event result in the IE Event results to Intra frequency measurement event results, Intra frequency event identity to 1c, and in "Cell measurement event results" include the CPICH info of all the non active cells which satisfy the event, and the rest of the entries as the cells that were in the virtual active set before the event occurred and that are worse than the best cell that triggered the event, in the order of their measured value (best one first);~~

~~5> do not include the IEs "measured results" or "additional measured results".~~

~~If the IE "Intra frequency measurement reporting criteria" is not stored for an inter frequency measurement, the IE "UE autonomous update mode" is set to "on" or "on with no reporting":~~

1> if Event 1a is not defined for the used frequency in other stored measurements of type "intra-frequency" at the time the inter-frequency measurement was set up:

2> the UE shall continuously update the virtual active set to consist of all cells on frequency  $F_i$  considered in that inter-frequency measurement, without sending any corresponding measurement report.

If none of the cells that are considered in the measurement on this frequency were measured, the UE may treat the virtual active set as empty and follow the appropriate initialisation procedure in subclause 14.11.1 when any relevant cell can first be measured.

[...]

## 11.3 Information element definitions

[...]

```

InterFreqMeasQuantity ::=          SEQUENCE {
  reportingCriteria              CHOICE {
    intraFreqReportingCriteria  SEQUENCE {
      intraFreqMeasQuantity     IntraFreqMeasQuantity
    },
    interFreqReportingCriteria  SEQUENCE {
      filterCoefficient         FilterCoefficient           DEFAULT fc0,
      modeSpecificInfo          CHOICE {
        fdd                     SEQUENCE {
          freqQualityEstimateQuantity-FDD  FreqQualityEstimateQuantity-FDD
        },
        tdd                     SEQUENCE {
          freqQualityEstimateQuantity-TDD  FreqQualityEstimateQuantity-TDD
        }
      }
    }
  }
}

InterFreqMeasuredResults ::=      SEQUENCE {
  frequencyInfo                 FrequencyInfo           OPTIONAL,
  ultra-CarrierRSSI             UTRA-CarrierRSSI        OPTIONAL,
  interFreqCellMeasuredResultsList  InterFreqCellMeasuredResultsList  OPTIONAL
}

InterFreqMeasuredResultsList ::= SEQUENCE (SIZE (1..maxFreq)) OF
  InterFreqMeasuredResults

InterFreqMeasurementSysInfo-RSCP ::= SEQUENCE {
  interFreqCellInfoSI-List      InterFreqCellInfoSI-List-RSCP  OPTIONAL
}

InterFreqMeasurementSysInfo-ECN0 ::= SEQUENCE {
  interFreqCellInfoSI-List      InterFreqCellInfoSI-List-ECN0  OPTIONAL
}

InterFreqMeasurementSysInfo-HCS-RSCP ::= SEQUENCE {
  interFreqCellInfoSI-List      InterFreqCellInfoSI-List-HCS-RSCP  OPTIONAL
}

InterFreqMeasurementSysInfo-HCS-ECN0 ::= SEQUENCE {
  interFreqCellInfoSI-List      InterFreqCellInfoSI-List-HCS-ECN0  OPTIONAL
}

InterFreqMeasurementSysInfo-RSCP-LCR-r4 ::= SEQUENCE {
  interFreqCellInfoSI-List      InterFreqCellInfoSI-List-RSCP-LCR  OPTIONAL
}

InterFreqMeasurementSysInfo-ECN0-LCR-r4 ::= SEQUENCE {
  interFreqCellInfoSI-List      InterFreqCellInfoSI-List-ECN0-LCR  OPTIONAL
}

InterFreqMeasurementSysInfo-HCS-RSCP-LCR-r4 ::= SEQUENCE {
  interFreqCellInfoSI-List      InterFreqCellInfoSI-List-HCS-RSCP-LCR  OPTIONAL
}

InterFreqMeasurementSysInfo-HCS-ECN0-LCR-r4 ::= SEQUENCE {
  interFreqCellInfoSI-List      InterFreqCellInfoSI-List-HCS-ECN0-LCR  OPTIONAL
}

InterFreqReportCriteria ::=      CHOICE {
  intraFreqReportingCriteria     IntraFreqReportingCriteria,
  interFreqReportingCriteria     InterFreqReportingCriteria,
  periodicalReportingCriteria    PeriodicalWithReportingCellStatus,
  noReporting                    ReportingCellStatusOpt
}

InterFreqReportCriteria-r4 ::=   CHOICE {
  intraFreqReportingCriteria-r4  IntraFreqReportingCriteria-r4,
  interFreqReportingCriteria     InterFreqReportingCriteria,
  periodicalReportingCriteria    PeriodicalWithReportingCellStatus,
  noReporting                    ReportingCellStatusOpt
}

```

```

}

InterFreqReportingCriteria ::= SEQUENCE {
    interFreqEventList          InterFreqEventList          OPTIONAL
}

InterFreqReportingQuantity ::= SEQUENCE {
    ultra-Carrier-RSSI          BOOLEAN,
    frequencyQualityEstimate    BOOLEAN,
    nonFreqRelatedQuantities    CellReportingQuantities
}

InterFrequencyMeasurement ::= SEQUENCE {
    interFreqCellInfoList       InterFreqCellInfoList,
    interFreqMeasQuantity        InterFreqMeasQuantity          OPTIONAL,
    interFreqReportingQuantity   InterFreqReportingQuantity  OPTIONAL,
    measurementValidity          MeasurementValidity            OPTIONAL,
    interFreqSetUpdate           UE-AutonomousUpdateMode        OPTIONAL,
    reportCriteria               InterFreqReportCriteria
}

InterFrequencyMeasurement-r4 ::= SEQUENCE {
    interFreqCellInfoList-r4     InterFreqCellInfoList-r4,
    interFreqMeasQuantity         InterFreqMeasQuantity          OPTIONAL,
    interFreqReportingQuantity    InterFreqReportingQuantity  OPTIONAL,
    measurementValidity           MeasurementValidity            OPTIONAL,
    interFreqSetUpdate            UE-AutonomousUpdateMode        OPTIONAL,
    reportCriteria-r4            InterFreqReportCriteria-r4
}

-- dummy and dummy2 are not used in this version of the specification, they should
-- not be sent and if received they should be ignored.
UE-AutonomousUpdateMode ::= CHOICE {
    dummyon          NULL,
    onWithNoReporting   NULL,
    offdummy2      RL-InformationLists
}

```

## CHANGE REQUEST

# 25.331 CR 2363 # rev - # Current version: 6.1.0 #

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

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

<b>Title:</b>	# Restrict operation of the virtual active set		
<b>Source:</b>	# RAN WG2		
<b>Work item code:</b>	# TEI5	<b>Date:</b>	# May/2004
<b>Category:</b>	# <b>A</b>	<b>Release:</b>	# Rel-6
	Use <u>one</u> of the following categories: <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		Use <u>one</u> 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)

<b>Reason for change:</b>	# The specification of the virtual active set is considered to be over complicated and poorly specified, this has created many problems with different interpretations being possible. The functionality is becoming increasingly complex with no significant benefit.  To simplify the operation of the virtual active set it is proposed to restrict the operation of the virtual active set to the following features only: <ol style="list-style-type: none"> <li>1. Permit one virtual active set per non-used frequency (This was the original intention)</li> <li>2. Permit UE autonomous update mode "on with no reporting" as the only method for initialising and updating the virtual active set</li> <li>3. Use the intra-frequency reporting criteria signalled in a separate intra-frequency measurement</li> </ol> This will effectively remove the following features: <ol style="list-style-type: none"> <li>1. Any ambiguity on the definition of a virtual active set.</li> <li>2. UE autonomous update mode "on" and "off"</li> <li>3. Signalling intra-frequency reporting criteria in an inter-frequency measurement</li> </ol>
<b>Summary of change:</b>	# Remove all references to obsolete functionality in sections...  8.4.1.3 Reception of MEASUREMENT CONTROL by the UE Remove references to modifying "intra-frequency reporting criteria" and "intra-frequency measurement reporting criteria" for an inter-frequency measurement.

8.6.7.14 Inter-frequency measurement  
 Added statement that the UE behaviour is unspecified if it receives an inter-frequency measurement with intra-frequency events specified.

10.3.7.16 Inter-frequency measurement  
 Remove reference to inter-frequency set update  
 Remove references to signalling intra-frequency reporting criteria

10.3.7.18 Inter-frequency measurement quantity  
 Remove references to signalling intra-frequency reporting criteria

10.3.7.22 Inter-frequency SET UPDATE  
 Removed all options **not** related to UE autonomous mode on with no reporting.

14.2.1 Inter-frequency reporting events  
 Remove references to signalling intra-frequency reporting criteria

14.11 UE autonomous update of virtual active set on non-used frequency (FDD only)  
 Remove references to signalling intra-frequency reporting criteria

14.11.1 Initial virtual active set  
 Remove references to UE autonomous update mode "on" and "off"

14.11.2 Virtual active set update during an inter-frequency measurement  
 Remove references to signalling intra-frequency reporting criteria  
 Remove references to UE autonomous update mode "on" and "off"

**Impact Analysis:**  
 This CR is effectively reducing the UE requirements therefore there should not be hardly any UE impact.  
 This CR would impact a UTRAN that is currently attempting to use the VAS modes being removed. However, it was a working assumption in RAN2 that no UTRAN is currently using the removed functionality. Furthermore, it would be practically impossible to use the removed functionality since it was agreed it is not working.

**Consequences if not approved:** ☹ The listed functionalities above do not work. Therefore, unnecessary UE requirements will be kept in the specification. Significant changes and increase in complexity will be required in order to correct the removed functionality.

**Clauses affected:** ☹

	Y	N	
<b>Other specs affected:</b>			Other core specifications ☹
			Test specifications ☹
			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.

### 8.4.1.3 Reception of MEASUREMENT CONTROL by the UE

Upon reception of a MEASUREMENT CONTROL message the UE shall perform actions specified in subclause 8.6 unless otherwise specified below.

The UE shall:

- 1> read the IE "Measurement command";
- 1> if the IE "Measurement command" has the value "setup":
  - 2> store this measurement in the variable MEASUREMENT\_IDENTITY according to the IE "measurement identity", first releasing any previously stored measurement with that identity if that exists;
  - 2> if the measurement type is quality, UE internal, intra-frequency, inter-frequency or inter-RAT:
    - 3> if the UE is in CELL\_FACH state:
      - 4> the UE behaviour is not specified.
    - 2> for measurement types "inter-RAT measurement" or "inter-frequency measurement" that require measurements on a frequency other than the actually used frequency:
      - 3> if, according to its measurement capabilities, the UE requires compressed mode to perform that measurement type and after reception of this message a compressed mode pattern sequence with an appropriate measurement purpose is active according to the IE "Current TGPS Status Flag" in UE variable TGPS\_IDENTITY; or
      - 3> if, according to its measurement capabilities, the UE does not require compressed mode to perform the measurements on at least one supported band of that measurement type:
        - 4> if the measurement is valid in the current RRC state of the UE:
          - 5> begin measurements according to the stored control information for this measurement identity.

NOTE: The UE is not required to perform measurements on cells for which it needs compressed mode but a suitable compressed mode pattern is not activated.

- 2> for measurement type "inter-frequency measurement" that requires measurements only on the same frequency as the actually used frequency:
  - 3> if the measurement is valid in the current RRC state of the UE:
    - 4> begin measurements according to the stored control information for this measurement identity.
- 2> for measurement type "UE positioning measurement":
  - 3> if the UE is in CELL\_FACH state:
    - 4> if IE "Positioning Method" is set to "OTDOA":
      - 5> if IE "Method Type" is set to "UE assisted":
        - 6> if IE "UE positioning OTDOA assistance data for UE assisted" is not included:
          - 7> if System Information Block type 15.4 is broadcast:
            - 8> read System Information Block type 15.4.
          - 7> act as specified in subclause 8.6.7.19.2.
        - 5> if IE "Method Type" is set to "UE based":
          - 6> if IE "UE positioning OTDOA assistance data for UE based" is not included:
            - 7> if System Information Block type 15.5 is broadcast:



- 8> read System Information Block type 15.5.
- 7> act as specified in subclause 8.6.7.19.2a.
- 2> for any other measurement type:
  - 3> if the measurement is valid in the current RRC state of the UE:
    - 4> begin measurements according to the stored control information for this measurement identity.
- 1> if the IE "Measurement command" has the value "modify":
  - 2> for all IEs present in the MEASUREMENT CONTROL message:
    - 3> if a measurement was stored in the variable MEASUREMENT\_IDENTITY associated to the identity by the IE "measurement identity":
      - 4> if the measurement type is quality, UE internal, intra-frequency, inter-frequency or inter-RAT:
        - 5> if the UE is in CELL\_FACH state:
          - 6> the UE behaviour is not specified.
        - 4> if measurement type is set to "intra-frequency measurement", for any of the optional IEs "Intra-frequency measurement objects list", "Intra-frequency measurement quantity", "Intra-frequency reporting quantity", "Measurement Validity", "report criteria" and "parameters required for each event" (given "report criteria" is set to "intra-frequency measurement reporting criteria") that are present in the MEASUREMENT CONTROL message:
        - 4> if measurement type is set to "inter-frequency measurement", for any of the optional IEs "Inter-frequency measurement quantity", "Inter-frequency reporting quantity", "Measurement Validity", "Inter-frequency set update" and "parameters required for each event" (given "report criteria" is set to either "inter-frequency measurement reporting criteria" or "intra-frequency measurement reporting criteria") that are present in the MEASUREMENT CONTROL message:
        - 4> if measurement type is set to "inter-RAT measurement", for any of the optional IEs "Inter-RAT measurement objects list", "Inter-RAT measurement quantity", "Inter-RAT reporting quantity" and "parameters required for each event" (given "report criteria" is set to "inter-RAT measurement reporting criteria") that are present in the MEASUREMENT CONTROL message:
        - 4> if measurement type is set to "UE positioning measurement" and the IE "UE positioning OTDOA assistance data" is present, for any of the optional IEs "UE positioning OTDOA neighbour cell info for UE-assisted", "UE positioning OTDOA reference cell info for UE-assisted", "UE positioning OTDOA reference cell info for UE-based", "UE positioning OTDOA neighbour cell info for UE-based" and "UE positioning" that are present in the MEASUREMENT CONTROL message:
        - 4> if measurement type is set to "UE positioning measurement" and the IE "UE positioning GPS assistance data" is present, for any of the optional IEs "UE positioning GPS reference time", "UE positioning GPS reference UE position", "UE positioning GPS DGPS corrections", "UE positioning GPS ionospheric model", "UE positioning GPS UTC model", "UE positioning GPS acquisition assistance", "UE positioning GPS real-time integrity" that are present in the MEASUREMENT CONTROL message:
        - 4> if measurement type is set to "traffic volume measurement", for any of the optional IEs "Traffic volume measurement Object", "Traffic volume measurement quantity", "Traffic volume reporting quantity", "Measurement Validity" and "parameters required for each event" (given "report criteria" is set to "traffic volume measurement reporting criteria") that are present in the MEASUREMENT CONTROL message:
        - 4> if measurement type is set to "quality measurement", for any of the optional IE "Quality reporting quantity" that is present in the MEASUREMENT CONTROL message:
        - 4> if measurement type is set to "UE internal measurement", for any of the optional IEs "UE internal measurement quantity", "UE internal reporting quantity" and "parameters required for each event" (given "report criteria" is set to "UE internal measurement reporting criteria") that are present in the MEASUREMENT CONTROL message:

- 5> replace all instances of the IEs listed above (and all their children) stored in variable MEASUREMENT\_IDENTITY associated to the identity indicated by the IE "measurement identity" with the IEs received in the MEASUREMENT CONTROL message;
  - 5> leave all other stored information elements unchanged in the variable MEASUREMENT\_IDENTITY.
- 3> otherwise:
- 4> set the variable CONFIGURATION\_INCOMPLETE to TRUE.
- 2> if measurement type is set to "inter-frequency measurement":
- 3> if "report criteria" is set to "intra-frequency measurement reporting criteria" and "reporting criteria" in "inter-frequency measurement quantity" is set to "intra-frequency reporting criteria":
    - 4> if IE "Parameters required for each event" is included:
      - 5> leave the currently stored "inter-frequency measurement reporting criteria" within "report criteria" and "inter-frequency reporting criteria" within "inter-frequency measurement quantity" unchanged, and continue to act on the information stored in these variables, ~~and also store the newly received "intra-frequency measurement reporting criteria" and "intra-frequency reporting criteria".~~
    - 4> otherwise:
      - 5> ~~leave the currently stored "inter-frequency measurement reporting criteria" and "intra-frequency measurement reporting criteria" within "report criteria" and "inter-frequency reporting criteria" within "inter-frequency measurement quantity" unchanged, and continue to act on the information stored in these variables, and also store the newly received "intra-frequency reporting criteria".~~
  - 3> otherwise:
    - 4> ~~clear the variables associated with the CHOICE "report criteria" and store the received "report criteria" choice;~~
    - 4> if the IE "inter-frequency measurement quantity" is present:
      - 5> ~~clear the variables associated with the choice "reporting criteria" in "inter-frequency measurement quantity" and store the received "reporting criteria" choice.~~
- NOTE:** If the UTRAN wants to modify the inter-frequency cell info list for an inter-frequency measurement configured with event based reporting without repeating any IEs related to the configured events, ~~the only one~~ possibility is to set the IE "report criteria" to "intra-frequency measurement reporting criteria", not include the IE "parameters required for each event", and set the IE "reporting criteria" in the IE "inter-frequency measurement quantity" to "intra-frequency reporting criteria".
- 2> for measurement types "inter-frequency measurement" that require measurements on a frequency other than the actually used frequency, or that require measurements on another RAT:
    - 3> if, according to its measurement capabilities, the UE requires compressed mode to perform that measurement type and after reception of this message a compressed mode pattern sequence with an appropriate measurement purpose is active according to the IE "Current TGPS Status Flag" in UE variable TGPS\_IDENTITY; or
    - 3> if, according to its measurement capabilities, the UE does not require compressed mode, on at least one supported band of that measurement type, to perform the measurements:
      - 4> resume the measurements according to the new stored measurement control information.
  - 2> for measurement type "inter-frequency measurement" that requires measurements only on the same frequency as the actually used frequency:
    - 3> if the measurement is valid in the current RRC state of the UE:
      - 4> resume measurements according to the new stored control information for this measurement identity.

- 2> for any other measurement type:
    - 3> resume the measurements according to the new stored measurement control information.
  - 1> if the IE "measurement command" has the value "release":
    - 2> terminate the measurement associated with the identity given in the IE "measurement identity";
    - 2> clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT\_IDENTITY.
  - 1> if the IE "DPCH Compressed Mode Status Info" is present:
    - 2> if, as the result of this message, UE will have more than one transmission gap pattern sequence with the same measurement purpose active (according to IE 'TGMP' in variable TGPS\_IDENTITY):
      - 3> set the variable CONFIGURATION\_INCOMPLETE to TRUE.
    - 2> if there is any pending "TGPS reconfiguration CFN" or any pending "TGCFN":
      - 3> the UE behaviour is unspecified;
    - 2> if pattern sequence corresponding to IE "TGPSI" is already active (according to "Current TGPS Status Flag") in the variable TGPS\_IDENTITY):
      - 3> if the "TGPS Status Flag" in this message is set to "deactivate" for the corresponding pattern sequence:
        - 4> deactivate this pattern sequence at the beginning of the frame indicated by IE "TGPS reconfiguration CFN" received in the message;
        - 4> set the "Current TGPS Status Flag" for this pattern sequence in the variable TGPS\_IDENTITY to "inactive".
      - 3> if the "TGPS Status Flag" in this message is set to "activate" for the corresponding pattern sequence:
        - 4> deactivate this pattern sequence at the beginning of the frame indicated by IE "TGPS reconfiguration CFN" received in the message.
- NOTE: The temporary deactivation of pattern sequences for which the status flag is set to "activate" can be used by the network to align the timing of already active patterns with newly activated patterns.
- 2> after the time indicated by IE "TGPS reconfiguration CFN" has elapsed:
    - 3> activate the pattern sequence corresponding to each IE "TGPSI" for which the "TGPS status flag" in this message is set to "activate" at the time indicated by IE "TGCFN"; and
    - 3> set the corresponding "Current TGPS status flag" for this pattern sequence in the variable TGPS\_IDENTITY to "active"; and
    - 3> begin the inter-frequency and/or inter-RAT measurements corresponding to the pattern sequence measurement purpose of each activated pattern sequence;
    - 3> if the values of IE "TGPS reconfiguration CFN" and IE "TGCFN" are equal:
      - 4> start the concerned pattern sequence immediately at that CFN.
  - 2> not alter pattern sequences stored in variable TGPS\_IDENTITY, if the pattern sequence is not identified in IE "TGPSI" in the received message.
- 1> if the UE in CELL\_FACH state receives a MEASUREMENT CONTROL message, which indicates the same measurement identity as that stored in the variable MEASUREMENT\_IDENTITY:
    - 2> update the stored information with the traffic volume measurement control information in variable MEASUREMENT\_IDENTITY; and
    - 2> refrain from updating the traffic volume measurement control information associated with this measurement identity in the variable MEASUREMENT\_IDENTITY with the information received in System Information

Block type 12 (or System Information Block type 11, according to subclause 8.1.1.6.11) until this measurement is explicitly released with another MEASUREMENT CONTROL message.

- 1> if the IE "Read SFN indicator" included in the IE "Cell info" of an inter-frequency cell is set to TRUE and the variable UE\_CAPABILITY\_TRANSFERRERD has the DL "Measurement capability" for "FDD measurements" set to TRUE (the UE requires DL compressed mode in order to perform measurements on FDD):
  - 2> set the variable CONFIGURATION\_INCOMPLETE to TRUE.
- 1> clear the entry for the MEASUREMENT CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS.

The UE may:

- 1> if the IE "Measurement command" has the value "setup":
  - 2> for measurement type "UE positioning measurement":
    - 3> if the UE is CELL\_FACH state:
      - 4> if IE "Positioning Method" is set to "GPS":
        - 5> if IE "UE positioning GPS assistance data" is not included and variable UE\_POSITIONING\_GPS\_DATA is empty:
          - 6> if System Information Block types 15, 15.1, 15.2 and 15.3 are broadcast:
            - 7> read System Information Block types 15, 15.1, 15.2 and 15.3.
          - 6> act as specified in subclause 8.6.7.19.3.
- 1> and the procedure ends.

#### 8.6.7.14 Inter-frequency measurement

If the Inter-frequency cell info list, included in the variable CELL\_INFO\_LIST, includes a number (M) of frequencies that is larger than the number (N) considered in a UE performance requirement defined in [19] and [20]:

- 1> the UE shall:
  - 2> meet this performance requirement on the first relevant (N) frequencies, according to the order defined by the position of the frequencies in the Inter-frequency cell info list, included in the variable CELL\_INFO\_LIST.
- 1> the UE may:
  - 2> ignore the remaining (M-N) frequencies.

If IE "Inter-frequency measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", but IE "Inter-frequency measurement quantity", IE "Inter-frequency reporting quantity" or IE "parameters required for each event" (given "CHOICE Report criteria" is set to "inter-frequency measurement reporting criteria" ~~or "intra-frequency measurement reporting criteria"~~) is not received, the UE shall:

- 1> clear all stored measurement control information related associated to this measurement identity in variable MEASUREMENT\_IDENTITY;
- 1> set the variable CONFIGURATION\_INCOMPLETE to TRUE.;

If IE "Inter-frequency measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "modify":

- 1> if CHOICE "Report criteria" in IE "Inter-frequency measurement" is set to "intra-frequency reporting criteria" and IE "parameters required for each event" is present:
  - 2> the UE behaviour is unspecified.

If IE "Inter-frequency measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup" and CHOICE "Report criteria" is set to "intra-frequency reporting criteria" in IE "Inter-frequency measurement":

1> the UE behaviour is unspecified.

In the case of an inter-frequency measurement for FDD, the UE shall:

1> if IE "Inter-frequency measurement" is received by the UE in a MEASUREMENT CONTROL message, where IE "measurement command" has the value "setup", if an inter-frequency event is configured that is different from event 2d or 2f, and if the IE "Inter-frequency SET UPDATE" is not received in that same message:

2> set the variable CONFIGURATION\_INCOMPLETE to TRUE.

~~1> if the IE "Inter-frequency SET UPDATE" is received:~~

~~2> if the value of the IE "UE autonomous update mode" set to "Off" or "On":~~

~~3> if more than one frequency is included in the list of cells pointed at in the IE "cells for measurement" if also included in the same IE "Inter-frequency measurement", or otherwise included in the "Inter-frequency cell info" part of the variable CELL\_INFO\_LIST:~~

~~4> set the variable CONFIGURATION\_INCOMPLETE to TRUE.~~

If IE "Inter-frequency measurement" is received by the UE in a MEASUREMENT CONTROL message:

1> if CHOICE "Report criteria" is set to "inter-frequency measurement reporting criteria" and CHOICE "reporting criteria" in "inter-frequency measurement quantity" is not set to "inter-frequency reporting criteria"; or

1> if CHOICE "Report criteria" is set to "intra-frequency measurement reporting criteria" and CHOICE "reporting criteria" in "inter-frequency measurement quantity" is not set to "intra-frequency reporting criteria":

2> the UE behaviour is not specified.

If the variable CONFIGURATION\_INCOMPLETE is set to TRUE, the UE shall:

1> act as described in subclause 8.4.1.4a.

### 10.3.7.16 Inter-frequency measurement

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Inter-frequency measurement objects list	MP		Inter-frequency cell info list 10.3.7.13	
Inter-frequency measurement quantity	OP		Inter-frequency measurement quantity 10.3.7.18	
Inter-frequency reporting quantity	OP		Inter-frequency reporting quantity 10.3.7.21	
Reporting cell status	CV-reporting		Reporting cell status 10.3.7.61	
Measurement validity	OP		Measurement validity 10.3.7.51	
Inter-frequency set update	OP		Inter-frequency set update 10.3.7.22	
CHOICE report criteria	MP			

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>Intra-frequency measurement reporting criteria			Intra-frequency measurement reporting criteria 10.3.7.39	
>Inter-frequency measurement reporting criteria			Inter-frequency measurement reporting criteria 10.3.7.19	
>Periodical reporting criteria			Periodical reporting criteria 10.3.7.53	
>No reporting				(no data) Chosen when this measurement only is used as additional measurement to another measurement

Condition	Explanation
Reporting	This IE is optional if the CHOICE "report criteria" is equal to "periodical reporting criteria" or "No reporting", otherwise the IE is not needed

### 10.3.7.18 Inter-frequency measurement quantity

The quantity the UE shall measure in case of inter-frequency measurement. It also includes the filtering of the measurements.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE <i>reporting criteria</i>	MP			
>Intra-frequency reporting criteria				
>>Intra-frequency measurement quantity	MP		Intra-frequency measurement quantity 10.3.7.38	
>Inter-frequency reporting criteria				
>>Filter coefficient	MP		Filter coefficient 10.3.7.9	
>>>CHOICE <i>mode</i>	MP			
>>>>FDD				
>>>>>Measurement quantity for frequency quality estimate	MP		Enumerated(CPICH Ec/N0, CPICH RSCP)	

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>>>TDD				
>>>>Measurement quantity for frequency quality estimate	MP		Enumerated( Primary CCPCH RSCP)	

**10.3.7.22 Inter-frequency SET UPDATE**

NOTE 1: Only for FDD.

~~Contains the changes of the virtual active set associated with a non-used frequency. This information makes it possible to use events defined for Intra-frequency measurement within the same non-used frequency for Inter-frequency measurement reporting criteria. This information also controls if the UE should use autonomous updating of the virtual active set associated with a non-used frequency.~~

Information Element/group name	Need	Multi	Type and reference	Semantics description
UE autonomous update mode	MP		Enumerated (On, On with no reporting, Off)	Required for backwards compatibility with a UE not supporting this revision of the standard
<del>Non-autonomous update mode</del>	<del>CV-Update</del>			
<del>&gt;Radio link addition information</del>	<del>OP</del>	<del>1 to &lt;maxRL&gt;</del>		<del>Radio link addition information required for each RL to add</del>
<del>&gt;&gt;Primary CPICH info</del>	<del>MP</del>		<del>Primary CPICH info 10.3.6.60</del>	<del>NOTE 2</del>
<del>&gt;Radio link removal information</del>	<del>OP</del>	<del>1 to &lt;MaxRL&gt;</del>		<del>Radio link removal information required for each RL to remove</del>
<del>&gt;&gt;Primary CPICH info</del>	<del>MP</del>		<del>Primary CPICH info 10.3.6.60</del>	<del>NOTE 2</del>

Condition	Explanation
<del>Update</del>	<del>The IE is mandatory present if the IE "UE autonomous update mode" is set to "Off", otherwise the IE is not needed.</del>

~~NOTE 2: If it is assumed that CPICH downlink scrambling code is always allocated with sufficient reuse distances, CPICH downlink scrambling code will be enough for designating the different radio links.~~

**14.2.1 Inter-frequency reporting events**

Within the measurement reporting criteria field in the MEASUREMENT CONTROL message UTRAN notifies the UE which events should trigger the UE to send a MEASUREMENT REPORT message. The listed events are the toolbox from which the UTRAN can choose the reporting events that are needed for the implemented handover evaluation function, or other radio network functions.

All events are evaluated with respect to one of the measurement quantities given in subclause 14.2.0a. The measurement quantities are measured on the monitored primary common pilot channels (CPICH) in FDD mode and the monitored primary common control channels (PCCPCH) in TDD mode of the cell defined in the measurement object. A "non-used frequency" is a frequency that the UE has been ordered to measure upon but is not used for the connection. A "used frequency" is a frequency that the UE has been ordered to measure upon and is also currently used for the connection.

The "monitored set on non-used frequency" consists of cells in "cells for measurement" (or all cells in CELL\_INFO\_LIST if "cells for measurement" is not present) that are not part of the virtual active set on that non-used frequency.

When one inter-frequency measurement identity corresponds to multiple ~~intra-frequency or~~ inter-frequency events with identical event identities, the UE behaviour is not specified.

## 14.11 UE autonomous update of virtual active set on non-used frequency (FDD only)

In the text that follows:

- a "non-used frequency" is a frequency that the UE has been ordered to measure upon but is not used for the connection. A "used frequency" is a frequency that the UE has been ordered to measure upon and is also currently used for the connection;
- a "non-used frequency (resp. cell) considered in an inter-frequency measurement" shall be understood as a non-used frequency (resp. cell) included in the list of cells pointed at in the IE "cells for measurement" if it was received for that measurement, or otherwise as a non-used frequency (resp. cell) included in the "Inter-frequency cell info" part of the variable CELL\_INFO\_LIST.

For event-triggered inter frequency measurements it is possible to ~~specify-use~~ intra-frequency measurements reporting events for support of maintenance of an active set associated with a non-used frequency considered in that measurement, a "virtual active set" and used in the evaluation of the frequency quality estimates. The "initial virtual active set" for a frequency is the virtual active set that is associated to that frequency just after a message was received that sets up or modifies the inter-frequency measurement.

The way the virtual active sets are initiated and updated for the non-used frequencies considered in an inter-frequency measurement is described in the two subclauses below, ~~and depends on whether the IE "intra-frequency reporting criteria" is stored for the inter-frequency measurement or not. In case that IE is not stored, the IE "intra-frequency measurement" stored in other measurements of type intra-frequency shall be used.~~

~~The UE shall support a single virtual active set per non-used frequency. The UE shall support 2 non-used frequencies.~~

### 14.11.1 Initial virtual active set

If the UE receives a MEASUREMENT CONTROL message that sets up or modifies an inter-frequency measurement and includes the IE "Inter-frequency set update", the UE shall:

- ~~1> if the IE "Intra-Frequency measurement reporting criteria" and the IE "Parameters required for each event" is included in the MEASUREMENT CONTROL message; or~~
- ~~1> if the IE "Intra-Frequency measurement reporting criteria" including the IE "Parameters required for each event" are stored for this measurement in the variable MEASUREMENT\_IDENTITY;~~
- ~~2> if the IE "UE autonomous update mode" is set to "on" or "on with no reporting";~~
- ~~3> for each non-used frequency  $F_i$  considered in the measurement:~~
  - ~~4> include in the initial virtual active set the  $N_i$  cells that have either the greatest downlink  $E_c/N_0$ , the greatest downlink RSCP after despreading, or the lowest pathloss (depending on what is indicated in the IE "inter-frequency measurement quantity"), among the cells on frequency  $F_i$  considered in that inter-frequency measurement, where:~~
    - ~~5> if event 1a is configured in the "Intra-Frequency measurement reporting criteria":~~

~~$$N_i = \min(N_{1a}, N_{Cells\ F_i}) \text{ if } N_{1a} \neq 0 \text{ and } N_i = N_{Cells\ F_i} \text{ otherwise.}$$~~

~~— where:~~



—  $N_{Ia}$  is the "Reporting deactivation threshold" included in the "Intra-Frequency measurement" IE received for that inter-frequency measurement for event 1a.

—  $N_{Cells Fi}$  is the number of cells on frequency  $F_i$  considered in that inter-frequency measurement.

5> else:

$$\underline{N_i = N_{Cells Fi}}$$

— where:

—  $N_{Cells Fi}$  is the number of cells on frequency  $F_i$  considered in that inter-frequency measurement.

2> if the IE "UE autonomous update mode" is set to "on":

3> if event 1a is configured in the "Intra-Frequency measurement reporting criteria":

4> send a MEASUREMENT REPORT with IEs set as follows:

5> set the Measurement identity to the identity of the inter-frequency measurement;

5> set the CHOICE event result in the IE Event results to Intra-frequency measurement event results, Intra-frequency event identity to 1a, and in "Cell measurement event results" the CPICH info of all the cells included in a virtual active set of the non-used frequency considered in the inter-frequency measurement;

5> do not include the IEs "measured results" or "additional measured results".

2> if the IE "UE autonomous update mode" is set to "Off":

3> if the IE "Measurement command" is set to "Modify", if the value previously stored for the IE "UE autonomous update mode" was also "Off":

4> apply the modifications indicated in the "Inter-frequency set update" to the virtual active set that was valid before the message was received for the non-used frequency considered in that inter-frequency measurement.

3> otherwise:

4> remove the possibly existing virtual active set of the non-used frequency considered in that measurement; and

4> set the initial virtual active set for it according to the "Inter-frequency set update" included in the message.

1> if the IE "Intra-Frequency measurement reporting criteria" and the IE "Parameters required for each event" were not included in the MEASUREMENT CONTROL message; and

1> the IE "Intra-Frequency measurement reporting criteria" including the IE "Parameters required for each event" are not stored for this measurement in the variable MEASUREMENT\_IDENTITY:

2> if the IE "UE autonomous update mode" is set to "on" or "on with no reporting":

31> for each non-used frequency  $F_i$  considered in the measurement:

42> include in the initial virtual active set the  $N_i$  cells that have either the greatest downlink  $E_c/N_0$  or the greatest downlink RSCP after despreading or the lowest pathloss (depending on what is indicated in the IE "inter-frequency measurement quantity"), among the cells on frequency  $F_i$  considered in that inter-frequency measurement, where:

53> if event 1a is configured for the used frequency in an intra-frequency measurement:

$$\underline{N_i = \min(N_{Ia}, N_{Cells Fi})} \text{ if } N_{Ia} \neq 0 \text{ and } \underline{N_i = N_{Cells Fi}} \text{ otherwise.}$$

where:

$N_{1a}$  is the "Reporting deactivation threshold" included in the intra-frequency measurement for the first event 1a defined in the intra-frequency measurement with the lowest identity.

$N_{Cells F_i}$  is the number of cells on frequency  $F_i$  considered in that inter-frequency measurement.

~~53~~> else:

$$N_i = N_{Cells F_i}$$

where:

$N_{Cells F_i}$  is the number of cells on frequency  $F_i$  considered in that inter-frequency measurement.

~~3~~> if the IE "UE autonomous update mode" is set to "on":

~~4~~> if event 1a is configured for the used frequency in an intra-frequency measurement:

~~5~~> send a measurement report with IEs set as follows:

~~6~~> set the Measurement identity to the identity of the inter-frequency measurement;

~~6~~> set the CHOICE event result in the IE Event results to Intra-frequency measurement event results, Intra-frequency event identity to 1a, and in "Cell measurement event results" the CPICH info of all the cells included in the initial virtual active set of the non-used frequency considered in that measurement;

~~6~~> do not include the IEs "measured results" or "additional measured results".

~~2~~> if the IE "UE autonomous update mode" is set to "off":

~~3~~> if the IE "Measurement command" is set to "Modify", if the value previously stored for the IE "UE autonomous update mode" was also "Off":

~~4~~> apply the modifications indicated in the "Inter-frequency set update" to the virtual active set that was valid before the message was received for the non-used frequency considered in that inter-frequency measurement.

~~3~~> otherwise:

~~4~~> remove the possibly-existing virtual active set of the non-used frequency considered in that measurement; and

~~4~~> set the initial virtual active set for it according to the "Inter-frequency set update" included in the message.

## 14.11.2 Virtual active set update during an inter-frequency measurement

If the IE "Intra-frequency measurement reporting criteria" is stored for an inter-frequency measurement and Event 1A is configured, the UE shall:

~~1~~> when Event 1a is triggered by a cell for a non-used frequency considered in that measurement (according to the criteria described in subclause 14.1.2.1):

~~2~~> if the "Reporting deactivation threshold" is equal to 0, or if the "Reporting deactivation threshold" is different from 0 and the number of cells included in the virtual active set for that frequency is less than or equal to the "Reporting deactivation threshold":

~~3~~> if the IE "UE autonomous update mode" is set to "on" or "on with no reporting":

~~4~~> add the primary CPICH that enters the reporting range to the "virtual active set".

~~3~~> if the IE "UE autonomous update mode" is set to "on" or "off":

4> send a measurement report with IEs set as below:

5> set the Measurement identity to the identity of the inter frequency measurement;

5> set the CHOICE event result in the IE Event results to Intra frequency measurement event results, Intra frequency event identity to 1a, and in "Cell measurement event results" the CPICH info of the cell that triggered the event;

5> do not include the IEs "measured results" or "additional measured results".

1> if Event 1b was configured, when this event is triggered by a cell for a non-used frequency considered in that measurement (according to the criteria described in subclause 14.1.2.2):

2> if the IE "UE autonomous update mode" is set to "on" or "on with no reporting" and if the number of cells included in the virtual active set is greater than 1:

3> remove the primary CPICH that leaves the reporting range from the "virtual active set".

2> if the IE "UE autonomous update mode" is set to "on" or "off":

3> send a measurement report with IEs set as below:

4> set the Measurement identity to the identity of the inter frequency measurement;

4> set the CHOICE event result in the IE Event results to Intra frequency measurement event results, Intra frequency event identity to 1b, and in "Cell measurement event results" the CPICH info of the cell that triggered the event;

4> do not include the IEs "measured results" or "additional measured results".

1> if Event 1c was configured, when this event is triggered by a cell for a non-used frequency considered in that measurement (according to the criteria described in subclause 14.1.2.3):

2> if the "Reporting activation threshold" is equal to 0, or if the "Reporting activation threshold" is different from 0 and the number of cells included in the virtual active set for that frequency is greater than or equal to the "Reporting activation threshold":

3> if the IE "UE autonomous update mode" is set to "on" or "on with no reporting":

4> rank all active and non-active primary CPICHs and take the  $n$  best cells to create a new "virtual active set", where  $n$  is the number of active primary CPICHs in the "virtual active set".

3> if the IE "UE autonomous update mode" is set to "on" or "off":

4> send a measurement report with IEs set as below:

5> set the Measurement identity to the identity of the inter frequency measurement;

5> set the CHOICE event result in the IE Event results to Intra frequency measurement event results, Intra frequency event identity to 1c, and in "Cell measurement event results" include the CPICH info of all the cells that satisfy the event, and the rest of the entries as the cells that were in the virtual active set before the event occurred and that are worse than the best cell that triggered the event, in the order of their measured value (best one first);

5> do not include the IEs "measured results" or "additional measured results".

If the IE "Intra frequency measurement reporting criteria" is stored for an inter frequency measurement, the IE "UE autonomous update mode" is set to "on" or "on with no reporting":

1> if event 1a is not configured:

2> the UE shall continuously update the virtual active set to consist of all cells on frequency  $F_i$  considered in that inter frequency measurement, without sending any corresponding measurement report.

If the IE "Intra frequency measurement reporting criteria" is not stored for that For an inter-frequency measurement, the UE shall:

- 1> apply the events of type 1a, 1b and 1c that were defined for the used frequency in other stored measurements of type "intra-frequency" at the time the inter-frequency measurement was set up; and
- 1> update the virtual active set for the non-used frequencies considered in that measurement according to the following rules:
  - 2> if several events of type 1a (resp. 1b,1c) were defined for the used frequency when the inter-frequency measurement was set up, only the first 1a event (resp 1b, 1c) that was defined in the measurement with the lowest measurement identity shall apply to the non-used frequencies;
  - 2> all the cells considered in the inter-frequency measurements shall be able to affect the reporting range for event 1a and 1b. (i.e. the IE "Cells forbidden to affect reporting range" possibly stored for the intra-frequency measurements on the used frequency does not apply to the non-used frequencies considered in the inter-frequency measurement);
  - 2> the IEs "amount of reporting" and "reporting interval" that were stored for the intra-frequency measurements on the used frequency shall not be considered if reports of the virtual active set updates are needed.
- 1> if event 1a is applicable to the non-used frequencies considered in the inter-frequency measurement:
  - 2> when this event is triggered (according to the criteria described in subclause 14.1.2.1) by a cell for a non-used frequency considered in that measurement:
    - 3> if the "Reporting deactivation threshold" is equal to 0, or if the "Reporting deactivation threshold" is different from 0 and the number of cells included in the virtual active set for that frequency is less than or equal to the "Reporting deactivation threshold":
      - 4> ~~if the IE "UE autonomous update mode" is set to "on" or "on with no reporting":~~
        - 5> ~~add the primary CPICH that enters the reporting range to the "virtual active set".~~
      - 4> ~~if the IE "UE autonomous update mode" is set to "on" or "off" send a measurement report with IEs set as below:~~
        - 5> ~~set the Measurement identity to the identity of the inter frequency measurement;~~
        - 5> ~~set the CHOICE event result in the IE Event results to Intra frequency measurement event results, Intra frequency event identity to 1a, and in "Cell measurement event results" the CPICH info of the cell that triggered the event;~~
        - 5> ~~do not include the IEs "measured results" or "additional measured results".~~
  - 2> if event 1b is applicable for the non-used frequencies considered in that inter-frequency measurement, when this event is triggered (according to the criteria described in subclause 14.1.2.2) by a cell for a non-used frequency considered in that measurement:
    - 3> ~~if the IE "UE autonomous update mode" is set to "on" or "on with no reporting" and~~ if the number of cells included in the virtual active set is greater than 1:
      - 4> remove the primary CPICH that leaves the reporting range from the "virtual active set".
    - 3> ~~if the IE "UE autonomous update mode" is set to "on" or "off", send a measurement report with IEs set as below:~~
      - 4> ~~set the Measurement identity to the identity of the inter frequency measurement;~~
      - 4> ~~set the CHOICE event result in the IE Event results to Intra frequency measurement event results, Intra frequency event identity to 1b, and in "Cell measurement event results" the CPICH info of the cell that triggered the event;~~
      - 4> ~~do not include the IEs "measured results" or "additional measured results".~~
- 2> if event 1c is applicable for the non-used frequencies considered in that inter-frequency measurement, when this event is triggered (according to the criteria described in subclause 14.1.2.3) by a cell for a non-used frequency considered in that measurement:

3> if the "Reporting activation threshold" is equal to 0, or if the "Reporting activation threshold" is different from 0 and the number of cells included in the virtual active set for that frequency is greater than or equal to the "Reporting activation threshold":

4> ~~if the IE "UE autonomous update mode" is set to "on" or "on with no reporting":~~

~~5> rank all active and non-active primary CPICHs and take the  $n$  best cells to create a new "virtual active set", where  $n$  is the number of active primary CPICHs in the "virtual active set".~~

4> ~~if the IE "UE autonomous update mode" is set to "on" or "off" send a measurement report with IEs set as below:~~

~~5> set the Measurement identity to the identity of the inter-frequency measurement.~~

~~5> set the CHOICE event result in the IE Event results to Intra frequency measurement event results, Intra frequency event identity to 1c, and in "Cell measurement event results" include the CPICH info of all the non active cells which satisfy the event, and the rest of the entries as the cells that were in the virtual active set before the event occurred and that are worse than the best cell that triggered the event, in the order of their measured value (best one first);~~

~~5> do not include the IEs "measured results" or "additional measured results".~~

~~If the IE "Intra frequency measurement reporting criteria" is not stored for an inter frequency measurement, the IE "UE autonomous update mode" is set to "on" or "on with no reporting":~~

1> if Event 1a is not defined for the used frequency in other stored measurements of type "intra-frequency" at the time the inter-frequency measurement was set up:

2> the UE shall continuously update the virtual active set to consist of all cells on frequency  $F_i$  considered in that inter-frequency measurement, without sending any corresponding measurement report.

If none of the cells that are considered in the measurement on this frequency were measured, the UE may treat the virtual active set as empty and follow the appropriate initialisation procedure in subclause 14.11.1 when any relevant cell can first be measured.

[...]

## 11.3 Information element definitions

[...]

```

InterFreqMeasQuantity ::=          SEQUENCE {
    reportingCriteria              CHOICE {
        intraFreqReportingCriteria SEQUENCE {
            intraFreqMeasQuantity  IntraFreqMeasQuantity
        },
        interFreqReportingCriteria SEQUENCE {
            filterCoefficient        FilterCoefficient          DEFAULT fc0,
            modeSpecificInfo         CHOICE {
                fdd                  SEQUENCE {
                    freqQualityEstimateQuantity-FDD  FreqQualityEstimateQuantity-FDD
                },
                tdd                  SEQUENCE {
                    freqQualityEstimateQuantity-TDD  FreqQualityEstimateQuantity-TDD
                }
            }
        }
    }
}

InterFreqMeasuredResults ::=          SEQUENCE {
    frequencyInfo                 FrequencyInfo                OPTIONAL,
    ultra-CarrierRSSI             UTRA-CarrierRSSI           OPTIONAL,
    interFreqCellMeasuredResultsList InterFreqCellMeasuredResultsList  OPTIONAL
}

InterFreqMeasuredResultsList ::=     SEQUENCE (SIZE (1..maxFreq)) OF
    InterFreqMeasuredResults

InterFreqMeasurementSysInfo-RSCP ::= SEQUENCE {
    interFreqCellInfoSI-List      InterFreqCellInfoSI-List-RSCP  OPTIONAL
}

InterFreqMeasurementSysInfo-ECN0 ::= SEQUENCE {
    interFreqCellInfoSI-List      InterFreqCellInfoSI-List-ECN0  OPTIONAL
}

InterFreqMeasurementSysInfo-HCS-RSCP ::= SEQUENCE {
    interFreqCellInfoSI-List      InterFreqCellInfoSI-List-HCS-RSCP  OPTIONAL
}

InterFreqMeasurementSysInfo-HCS-ECN0 ::= SEQUENCE {
    interFreqCellInfoSI-List      InterFreqCellInfoSI-List-HCS-ECN0  OPTIONAL
}

InterFreqMeasurementSysInfo-RSCP-LCR-r4 ::= SEQUENCE {
    interFreqCellInfoSI-List      InterFreqCellInfoSI-List-RSCP-LCR  OPTIONAL
}

InterFreqMeasurementSysInfo-ECN0-LCR-r4 ::= SEQUENCE {
    interFreqCellInfoSI-List      InterFreqCellInfoSI-List-ECN0-LCR  OPTIONAL
}

InterFreqMeasurementSysInfo-HCS-RSCP-LCR-r4 ::= SEQUENCE {
    interFreqCellInfoSI-List      InterFreqCellInfoSI-List-HCS-RSCP-LCR  OPTIONAL
}

InterFreqMeasurementSysInfo-HCS-ECN0-LCR-r4 ::= SEQUENCE {
    interFreqCellInfoSI-List      InterFreqCellInfoSI-List-HCS-ECN0-LCR  OPTIONAL
}

InterFreqReportCriteria ::=          CHOICE {
    intraFreqReportingCriteria     IntraFreqReportingCriteria,
    interFreqReportingCriteria     InterFreqReportingCriteria,
    periodicalReportingCriteria    PeriodicalWithReportingCellStatus,
    noReporting                    ReportingCellStatusOpt
}

InterFreqReportCriteria-r4 ::=       CHOICE {
    intraFreqReportingCriteria-r4  IntraFreqReportingCriteria-r4,
    interFreqReportingCriteria     InterFreqReportingCriteria,
    periodicalReportingCriteria    PeriodicalWithReportingCellStatus,
    noReporting                    ReportingCellStatusOpt
}

```

```

}

InterFreqReportingCriteria ::= SEQUENCE {
    interFreqEventList          InterFreqEventList          OPTIONAL
}

InterFreqReportingQuantity ::= SEQUENCE {
    ultra-Carrier-RSSI          BOOLEAN,
    frequencyQualityEstimate    BOOLEAN,
    nonFreqRelatedQuantities    CellReportingQuantities
}

InterFrequencyMeasurement ::= SEQUENCE {
    interFreqCellInfoList      InterFreqCellInfoList,
    interFreqMeasQuantity      InterFreqMeasQuantity          OPTIONAL,
    interFreqReportingQuantity InterFreqReportingQuantity    OPTIONAL,
    measurementValidity        MeasurementValidity          OPTIONAL,
    interFreqSetUpdate          UE-AutonomousUpdateMode        OPTIONAL,
    reportCriteria              InterFreqReportCriteria
}

InterFrequencyMeasurement-r4 ::= SEQUENCE {
    interFreqCellInfoList-r4   InterFreqCellInfoList-r4,
    interFreqMeasQuantity      InterFreqMeasQuantity          OPTIONAL,
    interFreqReportingQuantity InterFreqReportingQuantity    OPTIONAL,
    measurementValidity        MeasurementValidity          OPTIONAL,
    interFreqSetUpdate          UE-AutonomousUpdateMode        OPTIONAL,
    reportCriteria              InterFreqReportCriteria-r4
}

-- dummy and dummy2 are not used in this version of the specification, they should
-- not be sent and if received they should be ignored.
UE-AutonomousUpdateMode ::= CHOICE {
    dummyon          NULL,
    onWithNoReporting    NULL,
    offdummy2      RL-InformationLists
}

```