TSG-RAN Meeting #25 **RP-040328**
Palm Springs, USA, 07-09 April 2004 **Agenda item 7.3.3**

Source: **TSG-RAN WG2.**

Title: **Virtual Active Set: CRs to 25.331 R'99 with linked CRs to Rel-4/Rel-5/Rel-6 and Rel-5/Rel-6 CRs**

The following CRs are in RP-040328:

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New	Workitem	Doc-2nd-Level
25.331	2368	1	R99	Restrict operation of the virtual active set	F	3.19.0	3.20.0	TEI	R2-041822
25.331	2369	1	Rel-4	Restrict operation of the virtual active set	A	4.14.0	4.15.0	TEI	R2-041822
25.331	2417	-	Rel-5	Corrections to restrictions of operation of the virtual active set	F	5.9.0	5.10.0	TEI5	R2-041835
25.331	2418	-	Rel-6	Corrections to restrictions of operation of the virtual active set	A	6.2.0	6.3.0	TEI5	R2-041836
25.331	2427	-	Rel-5	Clarifications to VAS functionality	F	5.9.0	5.10.0	TEI5	R2-041888
25.331	2428	-	Rel-6	Clarifications to VAS functionality	A	6.2.0	6.3.0	TEI5	R2-041889

3GPP TSG-RAN-WG2 Meeting #43 **Tdoc ⌘R2-041822**
Prague, Czech Republic, 16th- 20th August 2004

CR-Form-v7

CHANGE REQUEST

⌘ **25.331** **CR** **2368** ⌘**rev** **1** ⌘ Current version: **3.19.0** ⌘

*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 ☐

Title:	⌘	Restrict operation of the virtual active set
Source:	⌘	RAN WG2
Work item code:	⌘	TEI
Date:	⌘	Aug/2004
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*

Reason for change: ⌘

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:

1. Permit one virtual active set per non-used frequency (This was the original intention)
2. Permit UE autonomous update mode "on with no reporting" as the only method for initialising and updating the virtual active set
3. Use the intra-frequency reporting criteria signalled in a separate intra-frequency measurement

This will effectively remove the following features:

1. Any ambiguity on the definition of a virtual active set.
2. UE autonomous update mode "on" and "off"
3. Signalling intra-frequency reporting criteria in an inter-frequency measurement

Summary of change: ⌘

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.

10.3.7.22 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”

11.3 ASN.1 definitions
Definitions of VAS UE-Autonomous Update mode for “on” and “off” set to dummy, as no longer used.

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:	⌘	8.4.1.3, 8.6.7.14, 10.3.7.22, 14.2.1, 14.11, 14.11.1, 14.11.1a, 14.11.2, 11.3			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘	This is a shadow of a previously agreed CR to Rel5 CR2362			

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 report criteria" and "reporting criteria" in "inter-frequency measurement quantity" is set to "intra-frequency reporting criteria":

4> leave the currently stored "inter-frequency report 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 report criteria" and 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: After UTRAN has configured the UE with an event triggered inter-frequency measurement using the virtual active set, if the UTRAN wants to modify the inter-frequency cell info list there are ~~three~~ two options:

1 - Send a MEASUREMENT CONTROL message modifying the inter-frequency measurement and setting the choice "report criteria" to "intra-frequency measurement reporting criteria", not including the IE "parameters required for each event" and setting the choice "reporting criteria" in the IE "inter-frequency measurement quantity" to "intra-frequency reporting criteria". ~~This approach can be used in the case that the intra-frequency events are inherited from an intra-frequency measurement or the case that they are specific to this inter-frequency measurement~~. According to section 14.11.1 this could result in re-initialisation of the virtual active set.

2 - Setup a second inter-frequency measurement with the choice "report criteria" set to "no reporting". To update the inter-frequency cell info list send a MEASUREMENT CONTROL to modify this second inter-frequency measurement. ~~This approach can be used to in the case that the intra-frequency events are inherited from an intra-frequency measurement or specific to the inter-frequency measurement~~. The MEASUREMENT CONTROL message can not update the IE "Cells for measurement" for the first inter-frequency measurement~~, and can not update virtual active for the first inter-frequency measurement in the case that the IE "autonomous update mode" is set to "off"~~.

3 - Send a MEASUREMENT CONTROL message modifying the inter-frequency measurement and setting the choice "report criteria" to "inter-frequency measurement reporting criteria" and including the IE "parameters required for each event". ~~This approach can be used to in the case that the intra-frequency events are inherited from an intra-frequency measurement.~~ This could result in the reset of the inter-frequency event triggers within the UE.

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 identitifed 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 measurement 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” in IE “Inter-frequency measurement” is set to “intra-frequency measurement reporting criteria”:

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 reporting criteria" and "inter-frequency measurement quantity" is not set to "inter-frequency reporting criteria"; or

1> if "CHOICE Report criteria" is set to "intra-frequency reporting criteria" and "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.

10.3.7.22 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 version of the standard.
~~Non autonomous update mode~~	~~CV-*Update*~~			
~~>Radio link addition information~~	~~OP~~	~~1 to~~		~~Radio link addition information~~

Information Element/group name	Need	Multi	Type and reference	Semantics description
		<maxRL>		required for each RL to add
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	NOTE 2
>Radio link removal information	OP	1 to <MaxRL>		Radio link removal information required for each RL to remove
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	NOTE 2

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

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~~ three 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 at least one single virtual active set per non-used frequency.

14.11.1 Initial virtual active set

The UE shall initialise the virtual active set according to this subclause or according to subclause 14.11.1a.

NOTE: The initialisation of the virtual active is not specified correctly in subclause 14.11.1. The initialisation of the virtual active set is correctly specified in subclause 14.11.1a. A UE implemented according to subclause 14.11.1 may have unexpected behaviour in case UTRAN does not follow the note in subclause 8.4.1.3.

The way the UE shall act when a MEASUREMENT CONTROL message is received that sets up or modifies an inter-frequency measurement, and that includes the IE "Inter-frequency set update" and/or the IE "Intra-Frequency reporting quantity" is described below. The UE shall:

1> if the IE "Intra-Frequency measurement reporting criteria" is included in the MEASUREMENT CONTROL message; or

1> if it was previously stored and if the IE "Inter-frequency set update" was included in the MEASUREMENT CONTROL message:

2> if the IE "UE autonomous update mode" received or previously stored 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":

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

where:

N_{1a} 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:

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

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" received or previously stored 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 "Inter-frequency set update" is included in the message and 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" and if the IE "Intra-frequency measurement reporting criteria" was not included in the message:~~

~~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.~~

~~2> if the IE "Inter-frequency set update" is not included in the message and if the IE "UE autonomous update mode" stored for the inter-frequency measurement is set to "Off":~~

~~3> remove the possibly existing virtual active set of the non-used frequency considered in that measurement; and~~

~~3> consider the virtual active set for it as empty.~~

1> if the IE "Intra-Frequency measurement reporting criteria" was not included in the MEASUREMENT CONTROL message:

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 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:

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

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

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.

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

5> else:

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

where:

$N_{Cells\ Fi}$ 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> set the initial virtual active set of the non-used frequency considered in that inter-frequency measurement according to what is included in the IE "Inter-frequency set update" included in the message; and

3> if the IE "Inter-frequency set update" was not received:

4> set the initial virtual active set for the frequencies considered in that measurement to be empty.

14.11.1a 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":

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

where:

N_{1a} 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:

$N_i = N_{Cells\ Fi}$

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":~~

~~3~~1> for each non-used frequency F_i considered in the measurement:

~~4~~2> 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:

~~5~~3> if event 1a is configured for the used frequency in an intra-frequency measurement:

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

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.

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

~~5~~3> else:

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

where:

$N_{Cells\,Fi}$ 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, the UE shall:

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

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 should 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 f~~For ~~that~~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, 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:

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~~3> 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 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:

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", send a measurement report with IEs set as below:~~

~~3> set the Measurement identity to the identity of the inter-frequency measurement;~~

~~3> 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;~~

~~3> do not include the IEs "measured results" or "additional measured results".~~

1> 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:

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~~3> 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 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 should 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 procedured in subclause 14.11.1 when any relevant cell can first be measured.

11.3 Information element definitions

[…]

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

[…]

3GPP TSG-RAN-WG2 Meeting #43 **Tdoc ⌘R2-041823**
Prague, Czech Republic, 16th- 20th August 2004

CR-Form-v7

CHANGE REQUEST

⌘ **25.331** **CR** **2369** ⌘**rev** **1** ⌘ Current version: **4.14.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Restrict operation of the virtual active set		
Source:	⌘	RAN WG2		
Work item code:	⌘	TEI	***Date:*** ⌘	Aug/2004
Category:	⌘	**A**	***Release:*** ⌘	Rel-4

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change: ⌘

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:

1. Permit one virtual active set per non-used frequency (This was the original intention)
2. Permit UE autonomous update mode “on with no reporting” as the only method for initialising and updating the virtual active set
3. Use the intra-frequency reporting criteria signalled in a separate intra-frequency measurement

This will effectively remove the following features:

1. Any ambiguity on the definition of a virtual active set.
2. UE autonomous update mode “on” and “off”
3. Signalling intra-frequency reporting criteria in an inter-frequency measurement

Summary of change: ⌘

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.

10.3.7.22 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”

11.3 ASN.1 definitions
Definitions of VAS UE-Autonomous Update mode for “on” and “off” set to dummy, as no longer used.

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:	⌘	8.4.1.3, 8.6.7.14, 10.3.7.22, 14.2.1, 14.11, 14.11.1, 14.11.1a, 14.11.2, 11.3			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘	This is a shadow of a previously agreed CR to Rel5 CR2362			

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 report criteria" and "reporting criteria" in "inter-frequency measurement quantity" is set to "intra-frequency reporting criteria":

4> leave the currently stored "inter-frequency report 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 report criteria" and 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: After UTRAN has configured the UE with an event triggered inter-frequency measurement using the virtual active set, if the UTRAN wants to modify the inter-frequency cell info list there are three options:

1 - Send a MEASUREMENT CONTROL message modifying the inter-frequency measurement and setting the choice "report criteria" to "intra-frequency measurement reporting criteria", not including the IE "parameters required for each event" and setting the choice "reporting criteria" in the IE "inter-frequency measurement quantity" to "intra-frequency reporting criteria". ~~This approach can be used in the case that the intra-frequency events are inherited from an intra-frequency measurement or the case that they are specific to this inter-frequency measurement.~~ According to section 14.11.1 this could result in re-initialisation of the virtual active set.

2 - Setup a second inter-frequency measurement with the choice "report criteria" set to "no reporting". To update the inter-frequency cell info list send a MEASUREMENT CONTROL to modify this second inter-frequency measurement. ~~This approach can be used to in the case that the intra-frequency events are inherited from an intra-frequency measurement or specific to the inter-frequency measurement.~~ The MEASUREMENT CONTROL message can not update the IE "Cells for measurement" for the first inter-frequency measurement~~, and can not update virtual active for the first inter-frequency measurement in the case that the IE "autonomous update mode" is set to "off"~~.

3 - Send a MEASUREMENT CONTROL message modifying the inter-frequency measurement and setting the choice "report criteria" to "inter-frequency measurement reporting criteria" and including the IE "parameters required for each event". ~~This approach can be used to in the case that the intra-frequency events are inherited from an intra-frequency measurement.~~ This could result in the reset of the inter-frequency event triggers within the UE.

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 identitifed 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 measurement 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” in IE “Inter-frequency measurement” is set to “intra-frequency measurement reporting criteria”:

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 reporting criteria" and "inter-frequency measurement quantity" is not set to "inter-frequency reporting criteria"; or

1> if "CHOICE Report criteria" is set to "intra-frequency reporting criteria" and "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.

10.3.7.22 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 version of the standard.
~~Non autonomous update mode~~	~~CV-*Update*~~			
~~>Radio link addition information~~	~~OP~~	~~1 to~~		~~Radio link addition information~~

Information Element/group name	Need	Multi	Type and reference	Semantics description
		<maxRL>		required for each RL to add
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	NOTE 2
>Radio link removal information	OP	1 to <MaxRL>		Radio link removal information required for each RL to remove
>>Primary CPICH info	MP		Primary CPICH info 10.3.6.60	NOTE 2

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

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~~ three 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 at least one single virtual active set per non-used frequency.

14.11.1 Initial virtual active set

The UE shall initialise the virtual active set according to this subclause or according to subclause 14.11.1a.

NOTE: The initialisation of the virtual active is not specified correctly in subclause 14.11.1. The initialisation of the virtual active set is correctly specified in subclause 14.11.1a. A UE implemented according to subclause 14.11.1 may have unexpected behaviour in case UTRAN does not follow the note in subclause 8.4.1.3.

The way the UE shall act when a MEASUREMENT CONTROL message is received that sets up or modifies an inter-frequency measurement, and that includes the IE "Inter-frequency set update" and/or the IE "Intra-Frequency reporting quantity" is described below. The UE shall:

1> if the IE "Intra-Frequency measurement reporting criteria" is included in the MEASUREMENT CONTROL message; or

1> if it was previously stored and if the IE "Inter-frequency set update" was included in the MEASUREMENT CONTROL message:

2> if the IE "UE autonomous update mode" received or previously stored 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":

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

where:

N_{1a} 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:

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

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" received or previously stored 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 "Inter-frequency set update" is included in the message and 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" and if the IE "Intra-frequency measurement reporting criteria" was not included in the message:~~

~~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.~~

~~2> if the IE "Inter-frequency set update" is not included in the message and if the IE "UE autonomous update mode" stored for the inter-frequency measurement is set to "Off":~~

~~3> remove the possibly existing virtual active set of the non-used frequency considered in that measurement; and~~

~~3> consider the virtual active set for it as empty.~~

1> if the IE "Intra-Frequency measurement reporting criteria" was not included in the MEASUREMENT CONTROL message:

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 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:

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

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

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.

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

5> else:

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

where:

$N_{Cells\ Fi}$ 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> set the initial virtual active set of the non-used frequency considered in that inter-frequency measurement according to what is included in the IE "Inter-frequency set update" included in the message; and

3> if the IE "Inter-frequency set update" was not received:

4> set the initial virtual active set for the frequencies considered in that measurement to be empty.

14.11.1a 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":

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

where:

N_{1a} 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:

$N_i = N_{Cells\ Fi}$

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":~~

~~3~~1> for each non-used frequency F_i considered in the measurement:

~~4~~2> 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:

~~5~~3> if event 1a is configured for the used frequency in an intra-frequency measurement:

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

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.

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

~~5~~3> else:

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

where:

$N_{Cells\ Fi}$ 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, the UE shall:

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

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 f~~For ~~that~~ 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, 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:

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~~3> 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 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:

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", send a measurement report with IEs set as below:~~

~~3> set the Measurement identity to the identity of the inter-frequency measurement;~~

~~3> 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;~~

~~3> do not include the IEs "measured results" or "additional measured results".~~

1> 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:

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~~3> 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 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 procedured in subclause 14.11.1 when any relevant cell can first be measured.

11.3 Information element definitions

[…]

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

[…]

3GPP TSG-RAN-WG2 Meeting #43 **Tdoc ⌘R2-041835**
Prague, Czech Republic, 16th- 20th August 2004

CR-Form-v7

CHANGE REQUEST

⌘ **25.331** **CR** **2417** ⌘ **rev** **-** ⌘ Current version: **5.9.0** ⌘

*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 ☐

Title:	⌘	Corrections to restrictions of operation of the virtual active set
Source:	⌘	RAN WG2
Work item code:	⌘	TEI5
Date:	⌘	Aug/2004
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Previously agreed CR2362 restricted the use of virtual active set functionality, but dueing application of this CR to Rel99/Rel4 some minor errors in the implementation of the original CR were found. This CR corrects these errors.
Summary of change:	⌘	1. IE names referenced in section 8.6.7.14 incorrectly follow the names defined in the ASN.1 rather than those defined in the tabular definition. 2. ASN.1 comment stating UE behaviour if dummy or dummy2 are received changed to state that the UE behaviour is unspecified, as it is not possible for the UE to ignore these choices. **Impact Analysis:** This CR has no affect on implementation, and just makes the specfication simpler to understand.
Consequences if not approved:	⌘	Specification will remain unclear and difficult to follow. For the case of the dummied ASN.1 parameters, the existing UE behaviour is not possible to implement.

Clauses affected:	⌘	8.6.7.14, 11.3

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

Other comments: ⌘

How to create CRs using this form:

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

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

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

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") 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 measurement 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" in IE "Inter-frequency measurement" is set to "intra-frequency measurement 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.

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.

11.3 Information element definitions

[…]

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

[…]

3GPP TSG-RAN-WG2 Meeting #43 **Tdoc ⌘R2-041836**
Prague, Czech Republic, 16th- 20th August 2004

CR-Form-v7

CHANGE REQUEST

⌘ **25.331** **CR** **2418** ⌘ **rev** **-** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Corrections to restrictions of operation of the virtual active set
Source:	⌘	RAN WG2
Work item code:	⌘	TEI5
Date:	⌘	Aug/2004
Category:	⌘	**A**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*

Reason for change: ⌘ Previously agreed CR2362 restricted the use of virtual active set functionality, but dueing application of this CR to Rel99/Rel4 some minor errors in the implementation of the original CR were found. This CR corrects these errors.

Summary of change: ⌘

1. IE names referenced in section 8.6.7.14 incorrectly follow the names defined in the ASN.1 rather than those defined in the tabular definition.

2. ASN.1 comment stating UE behaviour if dummy or dummy2 are received changed to state that the UE behaviour is unspecified, as it is not possible for the UE to ignore these choices.

Impact Analysis:
This CR has no affect on implementation, and just makes the specfication simpler to understand.

Consequences if not approved: ⌘ Specification will remain unclear and difficult to follow. For the case of the dummied ASN.1 parameters, the existing UE behaviour is not possible to implement.

Clauses affected: ⌘ 8.6.7.14, 11.3

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

Other comments: ⌘

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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.

8.6.7.14 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") 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 measurement 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" in IE "Inter-frequency measurement" is set to "intra-frequency measurement 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.

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.

11.3 Information element definitions

[…]

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

[…]

3GPP TSG-RAN-WG2 Meeting #43 **Tdoc ⌘R2-041888**
Prague, Czech Republic, 16th- 20th August 2004

CR-Form-v7.1

CHANGE REQUEST

⌘ **25.331** **CR** **2427** ⌘**rev** **-** ⌘ Current version: **5.9.0** ⌘

*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 ☐

Title:	⌘	Clarifications to VAS functionality
Source:	⌘	RAN WG2
Work item code:	⌘	TEI5
Date:	⌘	Aug/2004
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
Ph2 *(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)*
Rel-7 *(Release 7)*

Reason for change: ⌘ VAS Functionality is currently unclear in many areas (see discussion document R2-041785).

- it is not clear when and how to apply intrafreq criteria for control of interfreq VAS
- it is not clear what to do if the UE measurement capabities are exceeded
- initialisation of the VAS when a cell becomes available only after the measurement controlling a VAS is setup is not clear
- it not specified what to do on removal of cells from the cell_info_list and removal of a measurement controlling a VAS
- What to do with VAS when periodic reporting criteria are specified is not clear
- It is not clear that VAS initialisation is needed after an Inter-frequency Handover.
- It is unclear how to apply Intrafreq measurement quantities and frequency coefficients to VAS.
- There is no link between the Contents of the VAS and the maximum number of cells supported in an active set.
- Currently there is no specification for what to do if intra frequency reporting criteria are not relevant to interfrequency cells associated with the VAS.

Summary of change: ⌘

1. State in section 14.11.1 that use of multiple interfrequency measurements using VAS may exceed a UEs measurement capability, and to avoid this the UTRAN may apply 1 interfrequency measurement to multiple frequencies.

2. State in section section 8.4.1.4 that a measurement should be rejected if it the number of supported measurements would be exceeded.
3. Clarify in section 14.11.1 the timing of VAS initialisation clarified in the case where no cells can initially be measured.
4. Clarified in section 14.11.2 that the Intrafreq Measurements should be copied at the time of VAS initialisation.
5. Clarification in section 14.11.2 that release of a measurement controlling a VAS will also release the VAS and that removal of a cell from the cell-info-list which is also in the VAS will also remove the cell from the VAS.
6. Clarify in section 14.11.1 that the copied intrafreq measurement quantity and filter co-efficient used for VAS initialisation should be taken from the measurement where the event 1a is defined.
7. Clarify in section 14.11 that the virtual active set is not initialised and maintained for an inter frequency measurement with periodic reporting.
8. Clarify in section 14.11.1 of the need for VAS intialisation after Interfrequency handover.
9. Clarification in section 14.11.1 and 14.11.2 that initialisation of the VAS need consider the maximum number of cells that can be measured by the UE
10. Clarification in section 14.11.2 that copied events 1A, 1B and 1C should only apply to relevant cells for control of the VAS.

NOTE: most of these changes are made in section 14 to keep all the VAS related specification in one place.

Implementation of this CR by a R99/Rel-4 UE will not cause any compatibility issues.

Isolated Impact Analysis:
Functionality corrected: Inter-frequency measurements using virtual active set.

Isolated impact statement: Correction to a function where specification was missing procedural text or rules. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise. This CR limits the behaviour of the UTRAN such that only one inter-frequency VAS measurement can be configured per frequency. UTRAN implementations that don't take this into account already, to get around the problems highlighted, will require a modification.
.

Consequences if not approved:	⌘	Different implementations of VAS may not be compatible due to inconsistent VAS initialisation/maintenance and Measurement configuration rejecting, leading to possible problems with Interfrequency mobility. No workarounds for the problems highlighted were found.

Clauses affected:	⌘	8.4.1.4, 14.11, 14.11.1, 14.11.2			
Other specs affected:	⌘	**Y** / **N**	Other core specifications Test specifications O&M Specifications	⌘	
Other comments:	⌘				

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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.

8.4.1.4 Unsupported measurement in the UE

If UTRAN instructs the UE to perform a measurement that is not supported by the UE, or would cause the maximum number of reporting criteria supported by the UE [19] to be exceeded, the UE shall:

1> retain the measurement configuration that was valid before the MEASUREMENT CONTROL message was received;

1> set the IE "RRC transaction identifier" in the MEASUREMENT CONTROL FAILURE message to the value of "RRC transaction identifier" in the entry for the MEASUREMENT CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and

1> clear that entry.

1> set the cause value in IE "failure cause" to "unsupported measurement";

1> submit the MEASUREMENT CONTROL FAILURE message to lower layers for transmission on the DCCH using AM RLC;

1> continue with any ongoing processes and procedures as if the invalid MEASUREMENT CONTROL message has not been received;

1> and the procedure ends.

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 use intra-frequency measurement 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.

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

The virtual active set is not initialised and maintained for an inter-frequency measurement with periodic reporting. A virtual active set initialised and maintained by another inter-frequency measurement does not affect reporting of the periodic inter-frequency measurement.

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"~~,~~; or

if at least one cell can first be measured on a currently empty virtual active set (see subclause 14.11.2) the UE shall:

1> for each non-used frequency F_i considered in the measurement where cells can be measured:

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

~~2~~3> 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 (the measurement quantity to be used is determined by the IE "intra-frequency measurement quantity" of the intra-frequency measurement from which the event 1a configuration is taken~~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:

~~3> if event 1a is configured for the used frequency in an intra-frequency measurement:~~

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

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 at the time the inter-frequency measurement was received with the IE "Inter-frequency set update" present.

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

~~3~~2> else:

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

where:

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

NOTE: The UE initialises the virtual active set with up to the maximum number of inter-frequency cells supported by the UE as defined in [19].

NOTE: If the UTRAN configures more than one measurement using events 2A, 2B, 2C or 2E the UE measurement capabilities may be exceeded due to the necessary copying of 1A, 1B, 1C criteria. To avoid this the UTRAN may configure one measurement to apply to multiple frequencies so that the 1A, 1B, and 1C criteria will only be copied once.

NOTE: After a hard handover (see section 8.3.5), if the MEASUREMENT CONTROL message that restarts an inter-frequency measurement using the virtual active set does not include the IE "Inter-frequency set update", the UE behaviour regarding the virtual active set is not specified.

14.11.2 Virtual active set update during an inter-frequency measurement

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~~last received with the IE "Inter-frequency set update" present; 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~~last received with the IE "Inter-frequency set update" present, 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.

2> the measurement quantity and filter coefficient to be used is determined by the IE "intra-frequency measurement quantity" of the intra-frequency measurement from which the intra-frequency event configuration configuration is taken.

NOTE: If the measurement quantity and filter coefficients to be used differ for the 1a, 1b, and 1c events applied then the UE behaviour is unspecified.

1> if event 1a is applicable to the non-used frequencies considered in the inter-frequency measurement, the UE shall always only consider monitored cells that are not in the virtual active set for this event, and:

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

2> if event 1b is applicable for the non-used frequencies considered in that inter-frequency measurement, the UE shall always only consider cells in the virtual active set for this event, and 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 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".

2> if event 1c is applicable for the non-used frequencies considered in that inter-frequency measurement, the UE shall always only consider monitored cells for this event, and 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> 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".

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.

NOTE: The UE need only update the virtual active set with up to the maximum number of interfrequency cells supported by the UE as defined in [19].

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 procedured in subclause 14.11.1 when any relevant cell can first be measured.

If a cell is a member of the virtual active set and is removed from the variable CELL_INFO_LIST or removed from the list of cells pointed at by the IE "Cells for measurement" for the inter-frequency measurement then the UE shall remove the cell from the virtual active set.

If an inter-frequency measurement that initialised a virtual active set is released, then any virtual active set associated with this measurement shall also be released.

3GPP TSG-RAN-WG2 Meeting #43 **Tdoc ⌘R2-041889**
Prague, Czech Republic, 16th- 20th August 2004

CR-Form-v7.1

CHANGE REQUEST

⌘ **25.331** **CR** **2428** ⌘ **rev** **-** ⌘ Current version: **6.2.0** ⌘

*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 ☐

Title:	⌘	Clarifications to VAS functionality
Source:	⌘	RAN WG2
Work item code:	⌘	TEI5
Date:	⌘	Aug/2004
Category:	⌘	**A**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
Ph2 (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)
Rel-7 (Release 7)

Reason for change: ⌘ VAS Functionality is currently unclear in many areas (see discussion document R2-041785).

- it is not clear when and how to apply intrafreq criteria for control of interfreq VAS
- it is not clear what to do if the UE measurement capabities are exceeded
- initialisation of the VAS when a cell becomes available only after the measurement controlling a VAS is setup is not clear
- it not specified what to do on removal of cells from the cell_info_list and removal of a measurement controlling a VAS
- What to do with VAS when periodic reporting criteria are specified is not clear
- It is not clear that VAS initialisation is needed after an Inter-frequency Handover.
- It is unclear how to apply Intrafreq measurement quantities and frequency coefficients to VAS.
- There is no link between the Contents of the VAS and the maximum number of cells supported in an active set.
- Currently there is no specification for what to do if intra frequency reporting criteria are not relevant to interfrequency cells associated with the VAS.

Summary of change: ⌘

1. State in section 14.11.1 that use of multiple interfrequency measurements using VAS may exceed a UEs measurement capability, and to avoid this the UTRAN may apply 1 interfrequency measurement to multiple frequencies.

2. State in section section 8.4.1.4 that a measurement should be rejected if it the number of supported measurements would be exceeded.
3. Clarify in section 14.11.1 the timing of VAS initialisation clarified in the case where no cells can initially be measured.
4. Clarified in section 14.11.2 that the Intrafreq Measurements should be copied at the time of VAS initialisation.
5. Clarification in section 14.11.2 that release of a measurement controlling a VAS will also release the VAS and that removal of a cell from the cell-info-list which is also in the VAS will also remove the cell from the VAS.
6. Clarify in section 14.11.1 that the copied intrafreq measurement quantity and filter co-efficient used for VAS initialisation should be taken from the measurement where the event 1a is defined.
7. Clarify in section 14.11 that the virtual active set is not initialised and maintained for an inter frequency measurement with periodic reporting.
8. Clarify in section 14.11.1 of the need for VAS intialisation after Interfrequency handover.
9. Clarification in section 14.11.1 and 14.11.2 that initialisation of the VAS need consider the maximum number of cells that can be measured by the UE
10. Clarification in section 14.11.2 that copied events 1A, 1B and 1C should only apply to relevant cells for control of the VAS.

NOTE: most of these changes are made in section 14 to keep all the VAS related specification in one place.

Implementation of this CR by a R99/Rel-4 UE will not cause any compatibility issues.

Isolated Impact Analysis:
Functionality corrected: Inter-frequency measurements using virtual active set.

Isolated impact statement: Correction to a function where specification was missing procedural text or rules. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise. This CR limits the behaviour of the UTRAN such that only one inter-frequency VAS measurement can be configured per frequency. UTRAN implementations that don't take this into account already, to get around the problems highlighted, will require a modification.
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Consequences if not approved:	⌘	Different implementations of VAS may not be compatible due to inconsistent VAS initialisation/maintenance and Measurement configuration rejecting, leading to possible problems with Interfrequency mobility. No workarounds for the problems highlighted were found.

Clauses affected:	⌘	8.4.1.4, 14.11, 14.11.1, 14.11.2			
Other specs affected:	⌘	**Y** / **N**	Other core specifications	⌘	
			Test specifications		
			O&M Specifications		
Other comments:	⌘	This is a shadow of Rel5 CR2427			

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.

8.4.1.4 Unsupported measurement in the UE

If UTRAN instructs the UE to perform a measurement that is not supported by the UE, or would cause the maximum number of reporting criteria supported by the UE [19] to be exceeded, the UE shall:

1> retain the measurement configuration that was valid before the MEASUREMENT CONTROL message was received;

1> set the IE "RRC transaction identifier" in the MEASUREMENT CONTROL FAILURE message to the value of "RRC transaction identifier" in the entry for the MEASUREMENT CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS; and

1> clear that entry.

1> set the cause value in IE "failure cause" to "unsupported measurement";

1> submit the MEASUREMENT CONTROL FAILURE message to lower layers for transmission on the DCCH using AM RLC;

1> continue with any ongoing processes and procedures as if the invalid MEASUREMENT CONTROL message has not been received;

1> and the procedure ends.

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 use intra-frequency measurement 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.

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

The virtual active set is not initialised and maintained for an inter-frequency measurement with periodic reporting. A virtual active set initialised and maintained by another inter-frequency measurement does not affect reporting of the periodic inter-frequency measurement.

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"~~,~~; or

if at least one cell can first be measured on a currently empty virtual active set (see subclause 14.11.2) the UE shall:

1> for each non-used frequency F_i considered in the measurement where cells can be measured:

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

~~2~~3> 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 (the measurement quantity to be used is determined by the IE "intra-frequency measurement quantity" of the intra-frequency measurement from which the event 1a configuration is taken~~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:

~~3> if event 1a is configured for the used frequency in an intra-frequency measurement:~~

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

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 at the time the inter-frequency measurement was received with the IE "Inter-frequency set update" present.

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

~~3~~2> else:

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

where:

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

NOTE: The UE initialises the virtual active set with up to the maximum number of inter-frequency cells supported by the UE as defined in [19].

NOTE: If the UTRAN configures more than one measurement using events 2A, 2B, 2C or 2E the UE measurement capabilities may be exceeded due to the necessary copying of 1A, 1B, 1C criteria. To avoid this the UTRAN may configure one measurement to apply to multiple frequencies so that the 1A, 1B, and 1C criteria will only be copied once.

NOTE: After a hard handover (see section 8.3.5), if the MEASUREMENT CONTROL message that restarts an inter-frequency measurement using the virtual active set does not include the IE "Inter-frequency set update", the UE behaviour regarding the virtual active set is not specified.

14.11.2 Virtual active set update during an inter-frequency measurement

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~~last received with the IE "Inter-frequency set update" present; 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~~last received with the IE "Inter-frequency set update" present, 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.

2> the measurement quantity and filter coefficient to be used is determined by the IE "intra-frequency measurement quantity" of the intra-frequency measurement from which the intra-frequency event configuration configuration is taken.

NOTE: If the measurement quantity and filter coefficients to be used differ for the 1a, 1b, and 1c events applied then the UE behaviour is unspecified.

1> if event 1a is applicable to the non-used frequencies considered in the inter-frequency measurement, the UE shall always only consider monitored cells that are not in the virtual active set for this event, and:

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

2> if event 1b is applicable for the non-used frequencies considered in that inter-frequency measurement, the UE shall always only consider cells in the virtual active set for this event, and 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 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".

2> if event 1c is applicable for the non-used frequencies considered in that inter-frequency measurement, the UE shall always only consider monitored cells for this event, and 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> 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".

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.

NOTE: The UE need only update the virtual active set with up to the maximum number of interfrequency cells supported by the UE as defined in [19].

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 procedured in subclause 14.11.1 when any relevant cell can first be measured.

If a cell is a member of the virtual active set and is removed from the variable CELL_INFO_LIST or removed from the list of cells pointed at by the IE "Cells for measurement" for the inter-frequency measurement then the UE shall remove the cell from the virtual active set.

If an inter-frequency measurement that initialised a virtual active set is released, then any virtual active set associated with this measurement shall also be released.