TSG RAN Meeting #14 **RP-010791**

Kyoto, Japan, 11 - 14 December 2001

Title: **CRs (R'99 and Rel-4/Rel-5 Category A) to TS 25.133 (2)**

Source: **TSG RAN WG4**

Agenda Item: **8.4.3**

RAN4 Tdoc	Spec	CR	Title	Cat	Phase	Curr Ver	New Ver
R4-011519	25.133	205	Test conditions for UE Tx power measurement	F	Rel99	3.7.0	3.8.0
R4-011520	25.133	206	Test conditions for UE Tx power measurement	A	Rel-4	4.2.0	4.3.0
R4-011521	25.133	207	Test conditions for UE Tx power measurement	A	Rel-5	5.0.0	5.1.0
R4-011627	25.133	208	Correction to general requirements for support of compressed mode	F	Rel99	3.7.0	3.8.0
R4-011628	25.133	209	Correction to general requirements for support of compressed mode	A	Rel-4	4.2.0	4.3.0
R4-011629	25.133	210	Correction to general requirements for support of compressed mode	A	Rel-5	5.0.0	5.1.0
R4-011631	25.133	211	UE Tx Timing rate	F	Rel99	3.7.0	3.8.0
R4-011632	25.133	212	UE Tx Timing rate	A	Rel-4	4.2.0	4.3.0
R4-011633	25.133	213	UE Tx Timing rate	A	Rel-5	5.0.0	5.1.0
R4-011637	25.133	214	Requirements and test parameters for UE measurements	F	Rel99	3.7.0	3.8.0
R4-011638	25.133	215	Requirements and test parameters for UE measurements	A	Rel-4	4.2.0	4.3.0
R4-011639	25.133	216	Requirements and test parameters for UE measurements	A	Rel-5	5.0.0	5.1.0
R4-011640	25.133	217	Clarifications on requirements for reporting criteria per measurement category	F	Rel99	3.7.0	3.8.0
R4-011641	25.133	218	Clarifications on requirements for reporting criteria per measurement category	A	Rel-4	4.2.0	4.3.0
R4-011642	25.133	219	Clarifications on requirements for reporting criteria per measurement category	A	Rel-5	5.0.0	5.1.0
R4-011643	25.133	220	Inconsistent use of "sets of cells" with respect to definition of RRC specs.	F	Rel99	3.7.0	3.8.0
R4-011644	25.133	221	Inconsistent use of "sets of cells" with respect to definition of RRC specs.	A	Rel-4	4.2.0	4.3.0
R4-011645	25.133	222	Inconsistent use of "sets of cells" with respect to definition of RRC specs.	A	Rel-5	5.0.0	5.1.0

3GPP TSG RAN WG4 Meeting #20 R4-011519

East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133** **CR** **205** ⌘ ev **-** ⌘ Current version: **3.7.0** ⌘

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

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

Title:	⌘	Test conditions for UE Tx power measurement
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 2001-10-29
Category:	⌘	**F** ***Release:*** ⌘ Rel99

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)*

Reason for change:	⌘	Currently there is no test setup defined for the UE Tx power measurement in the annex of 25.133. The UE Tx power measurement is used for different purposes, e.g in the UE TFC selection algorithm. Therefore it is belived important that the requirement is also tested and as TSG T WG1 shall follow the annex in 25.133 when defining the tests the test set-up needs to be defined in the annex.
Summary of change:	⌘	A test set-up and procedure is defined for the UE Tx power measurement. Also an empty place holder section is created for the BLER measurement to follow the structure in section 9. Isolated Impact Analysis: Addition of a test case. Change in the test cases does not affect the function or the requirement.
Consequences if not approved:	⌘	The requirements on the UE Tx power measurement will not be tested.

Clauses affected:	⌘	A.9.1.3B (new), A.9.1.3C (new)		
Other specs affected:	⌘	☐ Other core specifications ☒ Test specifications ☐ O&M Specifications	⌘	34.121
Other comments:	⌘	Revised version of Tdoc R4-011379.		

How to create CRs using this form:

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

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under ftp://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.

A.9.1.3A GSM Carrier RSSI

A.9.1.3A.1 Test Purpose and Environment

The purpose of this test is to verify that the GSM Carrier RSSI measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.4.

In the test in Cell_DCH state compressed mode with purpose "GSM Carrier RSSI Measurement" is applied to measure on GSM. The gap length is 7, detailed definition is in TS 25.101 annex A.5. Table A.9.5A defines the limits of signal strengths and code powers on the UMTS FDD cell, where the requirement is applicable. In the measurement control information it is indicated to the UE that periodic reporting of the GSM RSSI measurement.

The limits of the GSM test parameters are defined in [21].

Table A.9.5A: General GSM Carrier RSSI test parameters

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Compressed mode patterns - GSM carrier RSSI measurement		Compressed mode reference pattern 2 Set 2	As specified in table A.22 TS 25.101 section A.5
Inter-RAT measurement quantity		GSM Carrier RSSI	
BSIC verification required		Not required	
Monitored cell list size		6 GSM neighbours including ARFCN 1	Measurement control information is sent before the compressed mode patterns starts.

Table A.9.5B: Cell specific GSM Carrier RSSI test parameters

Parameter	Unit	Cell 1
UTRA RF Channel number	-	Channel 1
Îor/Ioc	dB	-1
Ioc	dBm/ 3.84 MHz	-70
Propagation condition	-	AWGN

A.9.1.3A.2 Test Requirements

The GSM Carrier RSSI measurement accuracy shall meet the requirements in section 9.1.4.

The rate of correct measurements observed during repeated tests shall be at least 90%.

A.9.1.3B Transport channel BLER

NOTE: This section is included for consistency with numbering in section 9, currently no test covering requirements in sections 9.1.5 exists.

A.9.1.3B.1 Test Purpose and Environment

A.9.1.3B.2 Test Requirements

A.9.1.3C UE transmitted power

A.9.1.3C.1 Test Purpose and Environment

The purpose of this test is to verify that the UE transmitted power measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.6.

The test parameters are given in Table x and y below. In the measurement control information it shall be indicated to the UE that periodic reporting of the UE transmitted power measurement shall be used.

Table x: General test parameters for UE transmitted power

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	

Table y: Cell Specific parameters for UE transmitted power

Parameter	Unit	Cell 1
CPICH_Ec/Ior	dB	-10
PCCPCH_Ec/Ior	dB	-12
SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
DPCH_Ec/Ior	dB	Note1
OCNS		Note 2
$\hat{I}_{or}/I_{oc}$	dB	0
I_{oc}	dBm/3.84 MHz	-70
CPICH_Ec/Io	dB	-13
Propagation Condition		AWGN
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.		

Test procedure

1) Set the UE power and Maximum allowed UL TX power to the maximum power for that UE power class.

2) Send continuously during the entire test Up power control commands to the UE.

3) Measure the output power of the UE. The output power shall be averaged over the transmit one timeslot.

4) Check that the reported UE transmitted power is within the specified range.

5) Decrease the Maximum allowed UL TX power with 1 dB and signal the new value to the UE.

6) Repeat from step 3) until the entire specified range for the UE transmitted power measurement has been tested, i.e. the accuracy requirement for the UE transmitted power measurement is specified 10dB below the maximum power for the UE power class.

A.9.1.3C.2 Test Requirements

The UE transmitted power measurement accuracy shall meet the requirements in section 9.1.6.

The rate of correct measurements observed during repeated tests shall be at least 90%.

3GPP TSG RAN WG4 Meeting #20 R4-011520

East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133** **CR** **206** ⌘ ev **-** ⌘ Current version: **4.2.0** ⌘

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

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

Title:	⌘	Test conditions for UE Tx power measurement
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 2001-11-08
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)*

Reason for change:	⌘	Currently there is no test setup defined for the UE Tx power measurement in the annex of 25.133. The UE Tx power measurement is used for different purposes, e.g in the UE TFC selection algorithm. Therefore it is belived important that the requirement is also tested and as TSG T WG1 shall follow the annex in 25.133 when defining the tests the test set-up needs to be defined in the annex.
Summary of change:	⌘	A test set-up and procedure is defined for the UE Tx power measurement. Also an empty place holder section is created for the BLER measurement to follow the structure in section 9. Isolated Impact Analysis: Addition of a test case. Change in the test cases does not affect the function or the requirement.
Consequences if not approved:	⌘	The requirements on the UE Tx power measurement will not be tested.

Clauses affected:	⌘	A.9.1.3B (new), A.9.1.3C (new)		
Other specs affected:	⌘	☐ Other core specifications ☒ Test specifications ☐ O&M Specifications	⌘	34.121
Other comments:	⌘	Corresponding R99 CR in Tdoc R4-011519.		

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A.9.1.3A GSM Carrier RSSI

A.9.1.3A.1 Test Purpose and Environment

The purpose of this test is to verify that the GSM Carrier RSSI measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.4.

In the test in Cell_DCH state compressed mode with purpose "GSM Carrier RSSI Measurement" is applied to measure on GSM. The gap length is 7, detailed definition is in TS 25.101 annex A.5. Table A.9.5A defines the limits of signal strengths and code powers on the UMTS FDD cell, where the requirement is applicable. In the measurement control information it is indicated to the UE that periodic reporting of the GSM RSSI measurement.

The limits of the GSM test parameters are defined in [21].

Table A.9.5A: General GSM Carrier RSSI test parameters

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Compressed mode patterns - GSM carrier RSSI measurement		Compressed mode reference pattern 2 Set 2	As specified in table A.22 TS 25.101 section A.5
Inter-RAT measurement quantity		GSM Carrier RSSI	
BSIC verification required		Not required	
Monitored cell list size		6 GSM neighbours including ARFCN 1	Measurement control information is sent before the compressed mode patterns starts.

Table A.9.5B: Cell specific GSM Carrier RSSI test parameters

Parameter	Unit	Cell 1
UTRA RF Channel number	-	Channel 1
Îor/Ioc	dB	-1
Ioc	dBm/ 3.84 MHz	-70
Propagation condition	-	AWGN

A.9.1.3A.2 Test Requirements

The GSM Carrier RSSI measurement accuracy shall meet the requirements in section 9.1.4.

The rate of correct measurements observed during repeated tests shall be at least 90%.

A.9.1.3B Transport channel BLER

NOTE: This section is included for consistency with numbering in section 9, currently no test covering requirements in sections 9.1.5 exists.

A.9.1.3B.1 Test Purpose and Environment

A.9.1.3B.2 Test Requirements

A.9.1.3C UE transmitted power

A.9.1.3C.1 Test Purpose and Environment

The purpose of this test is to verify that the UE transmitted power measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.6.

The test parameters are given in Table x and y below. In the measurement control information it shall be indicated to the UE that periodic reporting of the UE transmitted power measurement shall be used.

Table x: General test parameters for UE transmitted power

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	

Table y: Cell Specific parameters for UE transmitted power

Parameter	Unit	Cell 1
CPICH_Ec/Ior	dB	-10
PCCPCH_Ec/Ior	dB	-12
SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
DPCH_Ec/Ior	dB	Note1
OCNS		Note 2
$\hat{I}_{or}/I_{oc}$	dB	0
I_{oc}	dBm/3.84 MHz	-70
CPICH_Ec/Io	dB	-13
Propagation Condition		AWGN
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.		

Test procedure

1) Set the UE power and Maximum allowed UL TX power to the maximum power for that UE power class.

2) Send continuously during the entire test Up power control commands to the UE.

3) Measure the output power of the UE. The output power shall be averaged over the transmit one timeslot.

4) Check that the reported UE transmitted power is within the specified range.

5) Decrease the Maximum allowed UL TX power with 1 dB and signal the new value to the UE.

6) Repeat from step 3) until the entire specified range for the UE transmitted power measurement has been tested, i.e. the accuracy requirement for the UE transmitted power measurement is specified 10dB below the maximum power for the UE power class.

A.9.1.3C.2 Test Requirements

The UE transmitted power measurement accuracy shall meet the requirements in section 9.1.6.

The rate of correct measurements observed during repeated tests shall be at least 90%.

3GPP TSG RAN WG4 Meeting #20 R4-011521

East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133** **CR** **207** ⌘ ev **-** ⌘ Current version: **5.0.0** ⌘

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

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

Title: ⌘	Test conditions for UE Tx power measurement	
Source: ⌘	RAN WG4	
Work item code: ⌘		***Date:*** ⌘ 2001-11-08
Category: ⌘	**A**	***Release:*** ⌘ Rel-5

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

Use one of the following releases:

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

Reason for change: ⌘	Currently there is no test setup defined for the UE Tx power measurement in the annex of 25.133. The UE Tx power measurement is used for different purposes, e.g in the UE TFC selection algorithm. Therefore it is belived important that the requirement is also tested and as TSG T WG1 shall follow the annex in 25.133 when defining the tests the test set-up needs to be defined in the annex.
Summary of change: ⌘	A test set-up and procedure is defined for the UE Tx power measurement. Also an empty place holder section is created for the BLER measurement to follow the structure in section 9. Isolated Impact Analysis: Addition of a test case. Change in the test cases does not affect the function or the requirement.
Consequences if not approved: ⌘	The requirements on the UE Tx power measurement will not be tested.

Clauses affected: ⌘	A.9.1.3B (new), A.9.1.3C (new)		
Other specs affected: ⌘	☐ Other core specifications ☒ Test specifications ☐ O&M Specifications	⌘	34.121
Other comments: ⌘	Corresponding R99 CR in Tdoc R4-011519.		

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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.

A.9.1.3A GSM Carrier RSSI

A.9.1.3A.1 Test Purpose and Environment

The purpose of this test is to verify that the GSM Carrier RSSI measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.4.

In the test in Cell_DCH state compressed mode with purpose "GSM Carrier RSSI Measurement" is applied to measure on GSM. The gap length is 7, detailed definition is in TS 25.101 annex A.5. Table A.9.5A defines the limits of signal strengths and code powers on the UMTS FDD cell, where the requirement is applicable. In the measurement control information it is indicated to the UE that periodic reporting of the GSM RSSI measurement.

The limits of the GSM test parameters are defined in [21].

Table A.9.5A: General GSM Carrier RSSI test parameters

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	
Compressed mode patterns - GSM carrier RSSI measurement		Compressed mode reference pattern 2 Set 2	As specified in table A.22 TS 25.101 section A.5
Inter-RAT measurement quantity		GSM Carrier RSSI	
BSIC verification required		Not required	
Monitored cell list size		6 GSM neighbours including ARFCN 1	Measurement control information is sent before the compressed mode patterns starts.

Table A.9.5B: Cell specific GSM Carrier RSSI test parameters

Parameter	Unit	Cell 1
UTRA RF Channel number	-	Channel 1
Îor/Ioc	dB	-1
Ioc	dBm/ 3.84 MHz	-70
Propagation condition	-	AWGN

A.9.1.3A.2 Test Requirements

The GSM Carrier RSSI measurement accuracy shall meet the requirements in section 9.1.4.

The rate of correct measurements observed during repeated tests shall be at least 90%.

A.9.1.3B Transport channel BLER

NOTE: This section is included for consistency with numbering in section 9, currently no test covering requirements in sections 9.1.5 exists.

A.9.1.3B.1 Test Purpose and Environment

A.9.1.3B.2 Test Requirements

A.9.1.3C UE transmitted power

A.9.1.3C.1 Test Purpose and Environment

The purpose of this test is to verify that the UE transmitted power measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.6.

The test parameters are given in Table x and y below. In the measurement control information it shall be indicated to the UE that periodic reporting of the UE transmitted power measurement shall be used.

Table x: General test parameters for UE transmitted power

Parameter	Unit	Value	Comment
DCH parameters		DL Reference Measurement Channel 12.2 kbps	As specified in TS 25.101 section A.3.1
Power Control		On	
Target quality value on DTCH	BLER	0.01	

Table y: Cell Specific parameters for UE transmitted power

Parameter	Unit	Cell 1
CPICH_Ec/Ior	dB	-10
PCCPCH_Ec/Ior	dB	-12
SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
DPCH_Ec/Ior	dB	Note1
OCNS		Note 2
$\hat{I}_{or}/I_{oc}$	dB	0
I_{oc}	dBm/3.84 MHz	-70
CPICH_Ec/Io	dB	-13
Propagation Condition		AWGN
Note 1: The DPCH level is controlled by the power control loop Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to I_{or}.		

Test procedure

1) Set the UE power and Maximum allowed UL TX power to the maximum power for that UE power class.

2) Send continuously during the entire test Up power control commands to the UE.

3) Measure the output power of the UE. The output power shall be averaged over the transmit one timeslot.

4) Check that the reported UE transmitted power is within the specified range.

5) Decrease the Maximum allowed UL TX power with 1 dB and signal the new value to the UE.

6) Repeat from step 3) until the entire specified range for the UE transmitted power measurement has been tested, i.e. the accuracy requirement for the UE transmitted power measurement is specified 10dB below the maximum power for the UE power class.

A.9.1.3C.2 Test Requirements

The UE transmitted power measurement accuracy shall meet the requirements in section 9.1.6.

The rate of correct measurements observed during repeated tests shall be at least 90%.

3GPP TSG RAN WG4 Meeting #20 **R4-011627**

East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133 CR 208** ⌘ ev **-** ⌘ Current version: **3.7.0** ⌘

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

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

Title:	⌘	Correction to general requirements for support of compressed mode
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 15 November 2001
Category:	⌘ **F**	***Release:*** ⌘ Rel99

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)

Reason for change:	⌘	The current text surrounding the requirement for support of compressed mode is ambiguous. In particular, the phrase "ensure that the activation of several transmission gap pattern sequences in parallel does not result in every frame being compressed" could be interpreted as indicating that only 1 out of every N frames (N>>1) need not contain a transmission gap. This could lead to very long sequences where every frame contains a transmission gap that would limit the ability of the power control loop to recover and would also negatively affect intra-frequency measurements.
Summary of change:	⌘	The text is corrected to ensure that there is at least one frame that does not contain a compressed mode gap within any window of three frames.
Consequences if not approved:	⌘	The text will remain ambiguous and may be interpreted as supporting very long sequences of compressed frames that would create problems for the power control and intra-frequency measurements. Isolated Impact Analysis: Correction to a function where the specification was : • ambiguous or not sufficiently explicit. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise. The corrected functionality is compressed mode support in the UE. • If the network implements the change but not the UE, the UE might reject the set of compressed mode parameters provided by the network. • If the UE implements the change but not the network, the UE might reject the set of compressed mode parameters provided by the network.
Clauses affected:	⌘	8.1.2.1

Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘		
Other comments:	⌘				

How to create CRs using this form:
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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.

8.1.2 Requirements

8.1.2.1 UE Measurement Capability

The UE shall be able to monitor up to

- 32 intra frequency FDD cells (including active set), and
- 32 inter frequency cells, including
- FDD mode cells distributed on up to 2 additional FDD carriers and
- Depending on UE Capability, TDD mode cells, distributed on up to 3 TDD carriers.

Depending on UE capability, the UE shall also in addition be able to support and process at least 32 GSM cells distributed on up to 32 GSM carriers.

- If the UE utilises compressed mode for inter-frequency and/or inter-RAT measurements, in order for the requirements in the following subsections to apply the UTRAN must : ~~provide~~
- provide transmission gap pattern sequences with TGPL1 > 1 ~~and ensure that the activation of several transmission gap pattern sequences in parallel does not result in every frame being compressed~~, and
- provide the patterns within a transmission gap pattern sequence that are identical (i.e., TGPL1 = TGPL2) , and~~.~~
- ensure that with the activation of one or more transmission gap pattern sequences, no more than two frames contain a transmission gap within any window of three consecutive frames, and
- ensure that there is a minimum of 8 slots between the end of the first transmission gap and the beginning of the second transmission gap in case of two successive compressed frames.

Performance requirements for different types of transmission gap pattern sequences and different number of cells is defined in the following sections.

The requirements in section 9 are applicable for a UE performing measurements according to this section.

The received CPICH E_c/I_o is defined as

$$\left(\frac{CPICH\_E_c}{I_o}\right)_{in\ dB} = \left(\frac{CPICH\_E_c}{I_{or}}\right)_{in\ dB} - \left(\frac{I_o}{\hat{I}_{or}}\right)_{in\ dB}$$

and the received SCH E_c/I_o is defined as

$$\left(\frac{SCH\_E_c}{I_o}\right)_{in\ dB} = \left(\frac{SCH\_E_c}{I_{or}}\right)_{in\ dB} - \left(\frac{I_o}{\hat{I}_{or}}\right)_{in\ dB}$$

8.1.2.2 FDD intra frequency measurements

During the CELL_DCH state the UE shall continuously measure detected intra frequency cells and search for new intra frequency cells in the monitoring set. In case the network requests the UE to report unlisted cells, the UE shall also search for intra frequency cells outside the monitored set. Cells, which are neither included in the active set nor in the monitored set, and are detected by the UE belong to the detected set according to TS 25.331. If compressed mode pattern sequences are activated, intra frequency measurements can be performed between the transmission gaps simultaneously for data reception from the active set cell/s.

3GPP TSG RAN WG4 Meeting #20 **R4-011628**

East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133** **CR** **209** ⌘ ev **-** ⌘ Current version: **4.2.0** ⌘

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

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

Title:	⌘	Correction to general requirements for support of compressed mode
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 15 November 2001
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)*

Reason for change:	⌘	The current text surrounding the requirement for support of compressed mode is ambiguous. In particular, the phrase "ensure that the activation of several transmission gap pattern sequences in parallel does not result in every frame being compressed" could be interpreted as indicating that only 1 out of every N frames (N>>1) need not contain a transmission gap. This could lead to very long sequences where every frame contains a transmission gap that would limit the ability of the power control loop to recover and would also negatively affect intra-frequency measurements.
Summary of change:	⌘	The text is corrected to ensure that there is at least one frame that does not contain a compressed mode gap within any window of three frames.
Consequences if not approved:	⌘	The text will remain ambiguous and may be interpreted as supporting very long sequences of compressed frames that would create problems for the power control and intra-frequency measurements. Isolated Impact Analysis: Correction to a function where the specification was : • ambiguous or not sufficiently explicit. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise. The corrected functionality is compressed mode support in the UE. • If the network implements the change but not the UE, the UE might reject the set of compressed mode parameters provided by the network. • If the UE implements the change but not the network, the UE might reject the set of compressed mode parameters provided by the network.
Clauses affected:	⌘	8.1.2.1

Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘		
Other comments:	⌘				

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://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.

8.1.2 Requirements

8.1.2.1 UE Measurement Capability

In CELL_DCH state the UE shall be able to monitor up to

- 32 intra frequency FDD cells (including active set), and
- 32 inter frequency cells, including
  - FDD cells distributed on up to 2 additional FDD carriers and
  - Depending on UE Capability, TDD cells, distributed on up to 3 TDD carriers and
- Depending on UE capability, 32 GSM cells distributed on up to 32 GSM carriers.

If the UE utilises compressed mode for inter-frequency and/or inter-RAT measurements, in order for the requirements in the following subsections to apply the UTRAN must ~~provide~~:

- ~~—~~provide transmission gap pattern sequences with TGPL1 > 1~~ and ensure that the activation of several transmission gap pattern sequences in parallel does not result in every frame being compressed~~, and
- provide the patterns within a transmission gap pattern sequence that are identical (i.e., TGPL1 = TGPL2), and
- ensure that with the activation of one or more transmission gap pattern sequences, no more than two frames contain a transmission gap within any window of three consecutive frames, and
- ensure that there is a minimum of 8 slots between the end of the first transmission gap and the beginning of the second transmission gap in case of two successive compressed frames.

Performance requirements for different types of transmission gap pattern sequences and different number of cells is defined in the following sections.

The requirements in section 9 are applicable for a UE performing measurements according to this section.

The received CPICH E_c/I_o is defined as

$$\left(\frac{CPICH\_E_c}{I_o}\right)_{in\ dB} = \left(\frac{CPICH\_E_c}{I_{or}}\right)_{in\ dB} - \left(\frac{I_o}{\hat{I}_{or}}\right)_{in\ dB}$$

and the received SCH E_c/I_o is defined as

$$\left(\frac{SCH\_E_c}{I_o}\right)_{in\ dB} = \left(\frac{SCH\_E_c}{I_{or}}\right)_{in\ dB} - \left(\frac{I_o}{\hat{I}_{or}}\right)_{in\ dB}$$

8.1.2.2 FDD intra frequency measurements

During the CELL_DCH state the UE shall continuously measure detected intra frequency cells and search for new intra frequency cells in the monitoring set. In case the network requests the UE to report unlisted cells, the UE shall also search for intra frequency cells outside the monitored set. Cells, which are neither included in the active set nor in the monitored set, and are detected by the UE belong to the detected set according to TS 25.331. If compressed mode pattern sequences are activated, intra frequency measurements can be performed between the transmission gaps simultaneously for data reception from the active set cell/s.

3GPP TSG RAN WG4 Meeting #20 **R4-011629**

East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133** **CR** **210** ⌘ ev **-** ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	Correction to general requirements for support of compressed mode
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 15 November 2001
Category:	⌘ **A**	***Release:*** ⌘ *Rel-5*

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

Use one of the following releases:

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

Reason for change: ⌘ The current text surrounding the requirement for support of compressed mode is ambiguous. In particular, the phrase “ensure that the activation of several transmission gap pattern sequences in parallel does not result in every frame being compressed” could be interpreted as indicating that only 1 out of every N frames (N>>1) need not contain a transmission gap. This could lead to very long sequences where every frame contains a transmission gap that would limit the ability of the power control loop to recover and would also negatively affect intra-frequency measurements.

Summary of change: ⌘ The text is corrected to ensure that there is at least one frame that does not contain a compressed mode gap within any window of three frames.

Consequences if not approved: ⌘ The text will remain ambiguous and may be interpreted as supporting very long sequences of compressed frames that would create problems for the power control and intra-frequency measurements.

Isolated Impact Analysis:
Correction to a function where the specification was :
- ambiguous or not sufficiently explicit.

Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

The corrected functionality is compressed mode support in the UE.
- If the network implements the change but not the UE, the UE might reject the set of compressed mode parameters provided by the network.
- If the UE implements the change but not the network, the UE might reject the set of compressed mode parameters provided by the network.

Clauses affected: ⌘ 8.1.2.1

Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘		
Other comments:	⌘				

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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.

8.1.2 Requirements

8.1.2.1 UE Measurement Capability

In CELL_DCH state the UE shall be able to monitor up to

- 32 intra frequency FDD cells (including active set), and
- 32 inter frequency cells, including
  - FDD cells distributed on up to 2 additional FDD carriers and
  - Depending on UE Capability, TDD cells, distributed on up to 3 TDD carriers and
- Depending on UE capability, 32 GSM cells distributed on up to 32 GSM carriers.

If the UE utilises compressed mode for inter-frequency and/or inter-RAT measurements, in order for the requirements in the following subsections to apply the UTRAN must ~~provide~~:

- provide transmission gap pattern sequences with TGPL1 > 1~~ and ensure that the activation of several transmission gap pattern sequences in parallel does not result in every frame being compressed~~, and
- provide the patterns within a transmission gap pattern sequence are identical (i.e., TGPL1 = TGPL2), and
- ensure that with the activation of one or more transmission gap pattern sequences, no more than two frames contain a transmission gap within any window of three consecutive frames, and
- ensure that there is a minimum of 8 slots between the end of the first transmission gap and the beginning of the second transmission gap in case of two successive compressed frames.

Performance requirements for different types of transmission gap pattern sequences and different number of cells is defined in the following sections.

The requirements in section 9 are applicable for a UE performing measurements according to this section.

The received CPICH E_c/I_o is defined as

$$\left(\frac{CPICH\_E_c}{I_o}\right)_{in\ dB} = \left(\frac{CPICH\_E_c}{I_{or}}\right)_{in\ dB} - \left(\frac{I_o}{\hat{I}_{or}}\right)_{in\ dB}$$

and the received SCH E_c/I_o is defined as

$$\left(\frac{SCH\_E_c}{I_o}\right)_{in\ dB} = \left(\frac{SCH\_E_c}{I_{or}}\right)_{in\ dB} - \left(\frac{I_o}{\hat{I}_{or}}\right)_{in\ dB}$$

8.1.2.2 FDD intra frequency measurements

During the CELL_DCH state the UE shall continuously measure detected intra frequency cells and search for new intra frequency cells in the monitoring set. In case the network requests the UE to report unlisted cells, the UE shall also search for intra frequency cells outside the monitored set. Cells, which are neither included in the active set nor in the monitored set, and are detected by the UE belong to the detected set according to TS 25.331. If compressed mode pattern sequences are activated, intra frequency measurements can be performed between the transmission gaps simultaneously for data reception from the active set cell/s.

3GPP TSG RAN WG4 Meeting #20 **R4-011631**

East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133** **CR** **211** ⌘ ev ⌘ Current version: **3.7.0** ⌘

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

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

Title:	⌘	UE Tx Timing adjustment rate
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 2001-11-15
Category:	⌘	**F** ***Release:*** ⌘ Rel99

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)*

Reason for change:	⌘	The current text of the UE transmit timing adjustment requirement unintentionally limits optimal transmit timing adjustments in all environments when the UE adjust its transmit timing with smaller steps than ¼ chip.
Summary of change:	⌘	The requirement of UE transmit timing adjustment is corrected to allow optimum transmit timing adjustments with smaller steps than ¼ chip. Isolated Impact Analysis: The UE transmit timing adjustment correction allows more optimal implementation for UE transmit timing adjustments. The correction does not affect the network since the current text already allows more than one adjustment in 200 ms as long as the UE transmit timing shall not change in excess of +-1/4 chip from the timing at the beginning of this 200 ms period.
Consequences if not approved:	⌘	Optimal UE performance is not allowed in all environments for terminals using smaller than ¼ chip step for transmit timing adjustment.

Clauses affected:	⌘	7.1.2		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

7 Timing and Signalling characteristics

7.1 UE Transmit Timing

7.1.1 Introduction

The UE shall have capability to follow the frame timing change of the connected Node B. The uplink DPCCH/DPDCH frame transmission takes place approximately T_0 chips after the reception of the first detected path (in time) of the corresponding downlink DPCCH/DPDCH frame. T_0 is defined in [2]. UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are defined in the following requirements.

7.1.2 Requirements

The UE initial transmission timing error shall be less than or equal to ±1.5 Chip. The reference point for the UE initial transmit timing control requirement shall be the time when the first significant path of the corresponding downlink DPCCH/DPDCH frame is received plus T_0 chips. T_0 is defined in [2].

The UE shall be capable of changing the transmission timing according the received downlink DPCCH/DPDCH frame. The maximum amount of the timing change in one adjustment shall be ¼ Chip.

The minimum adjustment rate shall be 233ns per second. The maximum adjustment rate shall be ¼ chip per 200ms. In particular, within any given 800*d~~200~~ ms period, the UE transmit timing shall not change in excess of +-d~~1/4~~ chip from the timing at the beginning of this 800*d~~200~~ms period, where 0≤d≤1/4.

3GPP TSG RAN WG4 Meeting #20 **R4-011632**

East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133** **CR** **212** ⌘ ev ⌘ Current version: **4.2.0** ⌘

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

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

Title:	⌘	UE Tx Timing adjustment rate
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 2001-11-15
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)*

Reason for change:	⌘	The current text of the UE transmit timing adjustment requirement unintentionally limits optimal transmit timing adjustments in all environments when the UE adjust its transmit timing with smaller steps than ¼ chip.
Summary of change:	⌘	The requirement of UE transmit timing adjustment is corrected to allow optimum transmit timing adjustments with smaller steps than ¼ chip. Isolated Impact Analysis: The UE transmit timing adjustment correction allows more optimal implementation for UE transmit timing adjustments. The correction does not affect the network since the current text already allows more than one adjustment in 200 ms as long as the UE transmit timing shall not change in excess of +-1/4 chip from the timing at the beginning of this 200 ms period.
Consequences if not approved:	⌘	Optimal UE performance is not allowed in all environments for terminals using smaller than ¼ chip step for transmit timing adjustment.

Clauses affected:	⌘	7.1.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

7 Timing and Signalling characteristics

7.1 UE Transmit Timing

7.1.1 Introduction

The UE shall have capability to follow the frame timing change of the connected Node B. The uplink DPCCH/DPDCH frame transmission takes place approximately T_0 chips after the reception of the first detected path (in time) of the corresponding downlink DPCCH/DPDCH frame. T_0 is defined in [2]. UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are defined in the following requirements.

7.1.2 Requirements

The UE initial transmission timing error shall be less than or equal to ±1.5 Chip. The reference point for the UE initial transmit timing control requirement shall be the time when the first significant path of the corresponding downlink DPCCH/DPDCH frame is received plus T_0 chips. T_0 is defined in [2].

The UE shall be capable of changing the transmission timing according the received downlink DPCCH/DPDCH frame. The maximum amount of the timing change in one adjustment shall be ¼ Chip.

The minimum adjustment rate shall be 233ns per second. The maximum adjustment rate shall be ¼ chip per 200ms. In particular, within any given 800*d~~200~~ ms period, the UE transmit timing shall not change in excess of +-d~~1/4~~ chip from the timing at the beginning of this 800*d~~200~~ms period, where $0 \leq d \leq 1/4$.

3GPP TSG RAN WG4 Meeting #20 **R4-011633**

East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133** **CR** **213** ⌘ ev ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	UE Tx Timing adjustment rate
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 2001-11-15
Category:	⌘	**A** ***Release:*** ⌘ Rel-5

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

Use one of the following releases:

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

Reason for change: ⌘ The current text of the UE transmit timing adjustment requirement unintentionally limits optimal transmit timing adjustments in all environments when the UE adjust its transmit timing with smaller steps than ¼ chip.

Summary of change: ⌘ The requirement of UE transmit timing adjustment is corrected to allow optimum transmit timing adjustments with smaller steps than ¼ chip.

Isolated Impact Analysis:

The UE transmit timing adjustment correction allows more optimal implementation for UE transmit timing adjustments. The correction does not affect the network since the current text already allows more than one adjustment in 200 ms as long as the UE transmit timing shall not change in excess of +-1/4 chip from the timing at the beginning of this 200 ms period.

Consequences if not approved: ⌘ Optimal UE performance is not allowed in all environments for terminals using smaller than ¼ chip step for transmit timing adjustment.

Clauses affected: ⌘ 7.1.2

Other specs affected: ⌘
☐ Other core specifications
☐ Test specifications
☐ O&M Specifications
⌘

Other comments: ⌘

7 Timing and Signalling characteristics

7.1 UE Transmit Timing

7.1.1 Introduction

The UE shall have capability to follow the frame timing change of the connected Node B. The uplink DPCCH/DPDCH frame transmission takes place approximately T_0 chips after the reception of the first detected path (in time) of the corresponding downlink DPCCH/DPDCH frame. T_0 is defined in [2]. UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are defined in the following requirements.

7.1.2 Requirements

The UE initial transmission timing error shall be less than or equal to ±1.5 Chip. The reference point for the UE initial transmit timing control requirement shall be the time when the first significant path of the corresponding downlink DPCCH/DPDCH frame is received plus T_0 chips. T_0 is defined in [2].

The UE shall be capable of changing the transmission timing according the received downlink DPCCH/DPDCH frame. The maximum amount of the timing change in one adjustment shall be ¼ Chip.

The minimum adjustment rate shall be 233ns per second. The maximum adjustment rate shall be ¼ chip per 200ms. In particular, within any given 800*d~~200~~ ms period, the UE transmit timing shall not change in excess of +-d~~1/4~~ chip from the timing at the beginning of this 800*d~~200~~ms period, where $0 \leq d \leq 1/4$.

3GPP TSG RAN WG4 Meeting #20 **R4-011637**

East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133** **CR** **214** ⌘ ev ⌘ Current version: **3.7.0** ⌘

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

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

Title:	⌘	Requirements and test parameters for UE measurements
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 2001-11-15
Category:	⌘	**F** ***Release:*** ⌘ Rel99

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)*

Reason for change: ⌘ At the RAN4, RAN2 and T1/RF joint meeting on RRM testing in Berlin 07/2001 it was agreed that Io conditions of accuracy requirements of some UE measurements e.g., CPICH RSCP measurement needs to be clarified to avoid more misunderstandings.

At the same meeting it was also agreed that RAN WG4 should define test conditions for some UE measurements e.g., CPICH RSCP and CPICH Ec/Io measurements in more detail

Summary of change: ⌘ 1) Io conditions have been clarified for the accuracy requirements of following measurements

- CPICH RSCP intra frequency measurements
- UTRA Carrier RSSI measurements
- P-CCPCH RSCP measurements

Instead of having two ranges for Io conditions –94 dBm…-70dBm and –94 dbm…-50 dBm the new ranges are –94 dBm…–70 dBm and –70 dBm…50 dBm.

2) An obvious typo for Io conditions for UTRA Carrier RSSI relative measurements has been corrected from –94 dBm … -70 dBm to –94 dBm … -50 dBm.

3) New test parameters for the CPICH RSCP, CPICH Ec/Io and UTRA Carrier RSSI measurements have been defined. Test parameters have been chosen using the following strategy:

- Tests are performed at both ends of specified Io conditions i.e. at –50 dBm and –94 dBm. Measurements are also performed at –69 dBm in tests where accuracy requirement changes at –70 dBm.
- Side conditions of related measurements are always fulfilled. In many

tests side conditions are just barely met. For example in some CPICH RSCP tests cases an absolute CPICH RSCP value have been –114 dBm, which is the lowest possible allowed by side conditions. Also CPICH_Ec/Io have been very close to –20 dBm in many measurements. The purpose of choosing tests parameters this way is to validate measurement capability in worst case conditions.

- The higher Io value is the higher Îor/Ioc value is specified
- The UE is not in SHO during the tests
- CPICH Ec/Io measurements tests are validating the accuracy for each specified accuracy category.
- DPCH_Ec/Ior level have been increased in some tests cases in order to have reasonable quality at DPCH in downlink.
- Test 1 of proposed CPICH RSCP and CPICH_Ec/Io tests fulfils also the side condition for SCH_Ec/Io which is defined for identification of a new intra or inter frequency cell.
- A note has been added to test tables that tests needs to be done sequentially and that tests parameters needs to be changed within 5 seconds. This is because in tests 2 and 3 SCH_Ec/Io for cell 2 may be below the specified identification limits. Thus when tests parameters are changed quickly UE will not loose the cell 2 during the time when tests parameters are being changed.

4) It has been clarified that compressed mode pattern set 1of Table A.22 in TS 25.101 is being used for inter frequency CPICH RSCP and CPICH Ec/Io tests

5) Since in tests a test equipment does not know the effect of thermal noise and noise generated in the receiver, the required accuracy on Io levels of -94…-87 dBm is relaxed in some of the CPICH Ec/Io and UTRA carrier RSSI tests by the impact of assumed thermal noise and noise generated in the receiver (–99 dBm). The modified tests are CPICH_Ec/Io Intra and Inter frequency absolute accuracy, CPICH_Ec/Io Inter frequency relative accuracy and UTRA Carrier RSSI absolute and relative accuracy tests.

Isolated Impact Analysis:

The proposed corrections are testing related and they do not change the behaviour of the UE. Hence, the changes do not affect the implementation.

Consequences if not approved:	⌘	Misunderstandings of Io conditions exists. Test parameters for CPICH RSCP, CPICH Ec/Io and UTRA Carrier RSSI are inadequate. Testing of CPICH_Ec/Io Intra and Inter frequency absolute accuracy, CPICH_Ec/Io Inter frequency relative accuracy and UTRA Carrier RSSI absolute and relative accuracy is not possible since a test equipment does not know thermal noise and noise generated in the receiver.

Clauses affected:	⌘	9.1.3.1, 9.1.3.2, A.9.1.1.1.1, A.9.1.1.1.2, A.9.1.2.1.1, A.9.1.2.1.2, A.9.1.2.2, A.9.1.3.1 and A.9.1.3.2		
Other specs affected:	⌘	[ ] Other core specifications [X] Test specifications [ ] O&M Specifications	⌘	34.121
Other comments:	⌘	It has been assumed that RAN WG1 will change the definition of UTRA Carrier RSSI and CPICH Ec/Io measurements so that thermal noise and noise generated in the receiver is included into UTRA Carrier RSSI and CPICH_Ec/Io measurements.		

9 Measurements Performance Requirements

One of the key services provided by the physical layer is the measurement of various quantities which are used to trigger or perform a multitude of functions. Both the UE and the UTRAN are required to perform a variety of measurements. The physical layer measurement model and a complete list of measurements is specified in TS 25.302 "Services Provided by Physical Layer". The physical layer measurements for FDD are described and defined in TS25.215 "Physical layer - Measurements (FDD)". In this clause for each measurement the relevant requirements on the measurement period, reporting range, granularity and performance in terms of accuracy are specified.

The accuracy requirements in this clause are applicable for AWGN radio propagation conditions.

9.1 Measurement Performance for UE

The requirements in this clause are applicable for a UE:

- in state CELL_DCH and state CELL_FACH.
- performing measurements according to section 8.
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in TS25.302.

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

Note: It needs to be clarified how the accuracy requirements shall be handled when the UE is measuring on cells using IPDL.

9.1.1 CPICH RSCP

Note: This measurement is for handover evaluation, DL open loop power control, UL open loop power control and for the calculation of pathloss.

9.1.1.1 Intra frequency measurements accuracy

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.2. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.2.

9.1.1.1.1 Absolute accuracy requirement

The accuracy requirements in table 9.1 are valid under the following conditions:

CPICH_RSCP1$|_{dBm}$ ≥ -114 dBm.

$$\left.\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}}\right)_{in\ dB} \leq 20dB$$

Table 9.1: CPICH_RSCP Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_RSCP	dBm	± 6	± 9	-94...-70
	dBm	± 8	± 11	-7094...-50

9.1.1.1.2 Relative accuracy requirement

The relative accuracy of CPICH RSCP is defined as the CPICH RSCP measured from one cell compared to the CPICH RSCP measured from another cell on the same frequency

The accuracy requirements in table 9.2 are valid under the following conditions:

CPICH_RSCP1,2|$_{dBm}$ ≥ -114 dBm.

$$\left| CPICH\_RSCP1\big|_{in\ dBm} - CPICH\_RSCP2\big|_{in\ dBm} \right| \le 20dB$$

$$\left(\frac{I_o}{\hat{I}_{or}} \right)_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}} \right)_{in\ dB} \le 20dB$$

Table 9.2: CPICH_RSCP Intra frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_RSCP	dBm	± 3	± 3	-94...-50

9.1.1.2 Inter frequency measurement accuracy

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.3. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.3.

9.1.1.2.1 Relative accuracy requirement

The relative accuracy of CPICH RSCP in inter frequency case is defined as the CPICH RSCP measured from one cell compared to the CPICH RSCP measured from another cell on a different frequency.

The accuracy requirements in table 9.3 are valid under the following conditions:

CPICH_RSCP1,2|$_{dBm}$ ≥ -114 dBm.

$$\left| CPICH\_RSCP1\big|_{in\ dBm} - CPICH\_RSCP2\big|_{in\ dBm} \right| \le 20dB$$

| Channel 1_Io|$_{dBm}$ -Channel 2_Io|$_{dBm}$| ≤ 20 dB.

$$\left(\frac{I_o}{\hat{I}_{or}} \right)_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}} \right)_{in\ dB} \le 20dB$$

Table 9.3: CPICH_RSCP Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_RSCP	dBm	± 6	± 6	-94...-50

9.1.1.3 CPICH RSCP measurement report mapping

The reporting range is for *CPICH RSCP* is from 115 ...-25 dBm.

In table 9.4 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.4

Reported value	Measured quantity value	Unit
CPICH_RSCP_LEV _00	CPICH RSCP <-115	dBm
CPICH_RSCP_LEV _01	-115 ≤ CPICH RSCP < -114	dBm
CPICH_RSCP_LEV _02	-114 ≤ CPICH RSCP < -113	dBm
…	…	…
CPICH_RSCP_LEV _89	-27 ≤ CPICH RSCP < -26	dBm
CPICH_RSCP_LEV _90	-26 ≤ CPICH RSCP < -25	dBm
CPICH_RSCP_LEV _91	-25 ≤ CPICH RSCP	dBm

9.1.2 CPICH Ec/Io

Note: This measurement is for Cell selection/re-selection and for handover evaluation.

9.1.2.1 Intra frequency measurements accuracy

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.2. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.2.

9.1.2.1.1 Absolute accuracy requirement

The accuracy requirements in table 9.5 are valid under the following conditions:

CPICH_RSCP1$|_{dBm}$ ≥ -114 dBm.

$$\left.\frac{I_o}{\hat{I}_{or}}\right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}}\right)_{in\ dB} \leq 20dB$$

Table 9.5: CPICH_Ec/Io Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50

9.1.2.1.2 Relative accuracy requirement

The relative accuracy of CPICH Ec/Io is defined as the CPICH Ec/Io measured from one cell compared to the CPICH Ec/Io measured from another cell on the same frequency.

The accuracy requirements in table 9.6 are valid under the following conditions:

CPICH_RSCP1,2$|_{dBm}$ ≥ -114 dBm.

$$\left|CPICH\_RSCP1|_{in\ dBm} - CPICH\_RSCP2|_{in\ dBm}\right| \leq 20dB$$

$$\left| \frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}}\right)_{in\ dB} \leq 20dB$$

Table 9.6: CPICH_Ec/Io Intra frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50

9.1.2.2 Inter frequency measurement accuracy

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.3. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.3.

9.1.2.2.1 Absolute accuracy requirement

The accuracy requirements in table 9.7 are valid under the following conditions:

CPICH_RSCP1$|_{dBm}$ ≥ -114 dBm.

$$\left| \frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}}\right)_{in\ dB} \leq 20dB$$

Table 9.7: CPICH_Ec/Io Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for –16 ≤ CPICH Ec/Io < -14 ± 3 for –20 ≤ CPICH Ec/Io < -16	± 3	-94...-50

9.1.2.2.2 Relative accuracy requirement

The relative accuracy of CPICH Ec/Io in the inter frequency case is defined as the CPICH Ec/Io measured from one cell compared to the CPICH Ec/Io measured from another cell on a different frequency

The accuracy requirements in table 9.8 are valid under the following conditions:

CPICH_RSCP1,2$|_{dBm}$ ≥ -114 dBm.

$$\left| CPICH\_RSCP1|_{in\ dBm} - CPICH\_RSCP2|_{in\ dBm} \right| \leq 20dB$$

| Channel 1_Io$|_{dBm}$ -Channel 2_Io$|_{dBm}$| ≤ 20 dB.

$$\left| \frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}}\right)_{in\ dB} \leq 20dB$$

Table 9.8: CPICH_Ec/Io Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50

9.1.2.3 CPICH Ec/Io measurement report mapping

The reporting range is for *CPICH Ec/Io* is from -24 ...0 dB.

In table 9.9 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.9

Reported value	Measured quantity value	Unit
CPICH_Ec/No _00	CPICH Ec/Io < -24	dB
CPICH_Ec/No _01	-24 ≤ CPICH Ec/Io < -23.5	dB
CPICH_Ec/No _02	-23.5 ≤ CPICH Ec/Io < -23	dB
…	…	…
CPICH_Ec/No _47	-1 ≤ CPICH Ec/Io < -0.5	dB
CPICH_Ec/No _48	-0.5 ≤ CPICH Ec/Io < 0	dB
CPICH_Ec/No _49	0 ≤ CPICH Ec/Io	dB

9.1.3 UTRA Carrier RSSI

NOTE: This measurement is for Inter-frequency handover evaluation.

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.2 for intra frequency measurements and in sub clause 8.1.2.2 for inter frequency measurements. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.2 for intra frequency measurements and in sub clause 8.4.2.3 for inter frequency measurements.

9.1.3.1 Absolute accuracy requirement

Table 9.10: UTRA Carrier RSSI~~Io~~ Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
UTRA Carrier RSSI~~Io~~	dBm	± 4	± 7	-94...-70
	dBm	± 6	± 9	-70~~94~~...-50

9.1.3.2 Relative accuracy requirement

The relative accuracy requirement is defined as the UTRAN RSSI measured from one frequency compared to the UTRAN RSSI measured from another frequency.

The accuracy requirements in table 9.11 are valid under the following condition:

$|\ \text{Channel 1\_Io}|_{\text{dBm}} - \text{Channel 2\_Io}|_{\text{dBm}}\ | < 20$ dB.

Table 9.11: UTRA Carrier RSSI~~Io~~ Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
UTRA Carrier RSSI~~Io~~	dBm	± 7	± 11	-94...-5~~7~~0

9.1.3.3 UTRA Carrier RSSI measurement report mapping

The reporting range for *UTRA carrier RSSI* is from -100 ...-25 dBm.

In table 9.12 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.12

Reported value	Measured quantity value	Unit
UTRA_carrier_RSSI_LEV _00	UTRA carrier RSSI < -100	dBm
UTRA_carrier_RSSI_LEV _01	-100 ≤ UTRA carrier RSSI < -99	dBm
UTRA_carrier_RSSI_LEV _02	-99 ≤ UTRA carrier RSSI < -98	dBm
…	…	…
UTRA_carrier_RSSI_LEV _74	-27 ≤ UTRA carrier RSSI < -26	dBm
UTRA_carrier_RSSI_LEV _75	-26 ≤ UTRA carrier RSSI < -25	dBm
UTRA_carrier_RSSI_LEV _76	-25 ≤ UTRA carrier RSSI	dBm

9.1.11 P-CCPCH RSCP

NOTE: This measurement is used for handover between UTRA FDD and UTRA TDD.

The requirements in this section are valid for terminals supporting this capability.

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.4. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.4.

9.1.11.1 Absolute accuracy requirements

The accuracy requirement in table 9.31is valid under the following conditions:

P-CCPCH_RSCP ≥ -102 dBm.

$$\left|\frac{I_o}{\hat{I}_{or}}\right|_{in\ dB} - \left|\frac{P-CCPCH\_E_c}{I_{or}}\right|_{in\ dB} \leq 8dB$$

Table 9.31: P-CCPCH_RSCP Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal conditions	Extreme conditions	Io [dBm]
P-CCPCH_RSCP	dBm	± 6	± 9	-94...-70
	dBm	± 8	± 11	-7094...-50

9.1.11.2 P-CCPCH RSCP measurement report mapping

The reporting range is for *P-CCPCH RSCP* is from -115 ... -25 dBm.

In table 9.32 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.32

Reported value	Measured quantity value	Unit
PCCPCH_RSCP_LEV _00	PCCPCH RSCP< -115	dBm
PCCPCH_RSCP_LEV _01	-115 ≤ PCCPCH RSCP< -114	dBm
PCCPCH_RSCP_LEV _02	-114 ≤ PCCPCH RSCP< -113	dBm
PCCPCH_RSCP_LEV _03	-113 ≤ PCCPCH RSCP< -112	dBm
…	…	…
PCCPCH_RSCP_LEV _89	-27 ≤ PCCPCH RSCP< -26	dBm
PCCPCH_RSCP_LEV _90	-26 ≤ PCCPCH RSCP< -25	dBm
PCCPCH_RSCP_LEV _91	-25 ≤ PCCPCH RSCP	dBm

A.9 Measurement Performance Requirements

Unless explicitly stated:

- Reported measurements shall be within defined range in 90 % of the cases.
- Measurement channel is 12.2 kbps as defined in TS 25.101 annex A, sub-clause A.3.1. This measurement channel is used both in active cell and cells to be measured.
- Physical channels used as defined in TS 25.101 annex C.
- Cell 1 is the active cell.
- Single task reporting.
- Power control is active.

A.9.1 Measurement Performance for UE

A.9.1.1 CPICH RSCP

A.9.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH RSCP measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.1.

A.9.1.1.1.1 Intra frequency test parameters

In this case all cells are on the same frequency. ~~Table A.9.1 defines the limits of signal strengths and code powers, when the requirements are applicable.~~ Both CPICH RSCP intra frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.1.

~~When verifying the CPICH RSCP intra frequency absolute accuracy requirement only cell 1 in table A.9.1 shall be present. When verifying the CPICH RSCP intra frequency relative accuracy requirement both cell 1 and 2 in table A.9.1 shall be present.~~

Table A.9.1: CPICH RSCP Intra frequency test parameters

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 1
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
Îor/Ioc	dB	10.5	10.5
Ioc	dBm/ 3.84 MHz	*Io -13.7 dB = Ioc*, Note 1	*Io -13.7 dB = Ioc*, Note 1
Range 1:Io Range 2: Io	dBm	-94…-70 -94… 50	-94…-70 -94… 50
Propagation condition	-	AWGN	
NOTE 1: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.			

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1		Channel 1		Channel 1	
CPICH_Ec/Ior	dB	-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15	
DPCH_Ec/Ior	dB	-15	-	-15	-	-15	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-1.11	-0.94	-1.11	-0.94
Ioc	dBm/ 3.84 MHz	-75.54		-59.98		-97.52	
Îor/Ioc	dB	4	0	9	0	0	-6.53
CPICH RSCP, Note 1	dBm	-81.5	-85.5	-60.98	-69.88	-107.5	-114.0
Io, Note 1	dBm	-69		-50		-94	
Propagation condition	-	AWGN		AWGN		AWGN	
NOTE 1: CPICH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.							

A.9.1.1.1.2 Inter frequency test parameters

In this case both cells are on different frequencies and compressed mode is applied. The gap length is 7, detailed definition is in TS 25.101 annex A.5, Set 1 of Table A.22 [14 slots is FSS]. Table A.9.2 defines the limits of signal strengths and code powers, where the requirement is applicable. CPICH RSCP inter frequency relative accuracy requirements are tested by using test parameters in Table A.9.2.

When verifying the CPICH RSCP inter frequency relative accuracy requirement both cell 1 and 2 in table A.9.2 shall be present.

Table A.9.2: CPICH RSCP Inter frequency tests parameters

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
Îor/Ioc	dB	10.1	10.1
Ioc	dBm/ 3.84 MHz	*Io -10.6 dB = Ioc*, Note 1	*Io -10.6 dB = Ioc*, Note 1
Range 1:Io Range 2: Io	dBm	-94… 70 -94…-50	-94… 70 -94…-50
Propagation condition	-	AWGN	
NOTE 1: *Ioc* level shall be adjusted in each carrier frequency according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.			

Parameter	Unit	Test 1		Test 2	
		Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2	Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12	
SCH_Ec/Ior	dB	-12		-12	
PICH_Ec/Ior	dB	-15		-15	
DPCH_Ec/Ior	dB	-15	-	-15	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-1.11	-0.94
Ioc	dBm/ 3.84 MHz	-60.00	-60.00	-84.00	-94.46
Îor/Ioc	dB	9.54	9.54	0	-9.54
CPICH RSCP, Note 1	dBm	-60.46	-60.46	-94.0	-114.0
Io, Note 1	dBm	-50.00	-50.00	-81.0	-94.0
Propagation condition	-	AWGN		AWGN	
NOTE 1: CPICH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.					
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for test 2 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.					

A.9.1.1.2 Test Requirements

The CPICH RSCP measurement accuracy shall meet the requirements in section 9.1.1.

A.9.1.2 CPICH Ec/Io

A.9.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH Ec/Io measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.2.

A.9.1.2.1.1 Intra frequency test parameters

In this case all cells are in the same frequency. Table A.9.3 defines the limits of signal strengths and code powers, where the requirements are applicable. Both CPICH Ec/Io absolute and relative accuracy requirements are tested by using test parameters in Table A.9.3

When verifying the CPICH Ec/Io intra frequency absolute accuracy requirement only cell 1 in table A.9.3 shall be present. When verifying the CPICH Ec/Io intra frequency relative accuracy requirement both cell 1 and 2 in table A.9.3 shall be present.

Table A.9.3: CPICH Ec/Io Intra frequency test parameters

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 1
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
Îor/Ioc	dB	10.5	10.5
Ioc	dBm/ 3.84 MHz	*Io -13.7 dB = Ioc*, Note 1	*Io -13.7 dB = Ioc*, Note 1
Range 1:Io Range 2: Io	dBm	-94…-70 -94…-50	-94…-70 -94…-50
Propagation condition	-	AWGN	
NOTE 1: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.			

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1		Channel 1		Channel 1	
CPICH_Ec/Ior	dB	-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15	
DPCH_Ec/Ior	dB	-15	-	-15	-	-6	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-1.11	-0.94	.2.56	-0.94
Ioc	dBm/ 3.84 MHz	-56.98		-89.07		-94.98	
Îor/Ioc	dB	3.0	3.0	-2.9	-2.9	-9.0	-9.0
CPICH Ec/Io, Note 1	dBm	-14.0	-14.0	-16.0	-16.0	-20.0	-20.0
Io, Note 1	dBm	-50		-86		-94	
Propagation condition	-	AWGN		AWGN		AWGN	
NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.							

A.9.1.2.1.2 Inter frequency test parameters

In this case both cells are in different frequency and compressed mode is applied. The gap length is 7, detailed definition is in TS 25.101 annex A.5, Set 1 of Table A.22 [14 slots is FSS]. Table A.9.4 defines the limits of signal strengths and code powers, where the requirement is applicable. CPICH Ec/Io inter frequency relative accuracy requirements are tested by using test parameters in Table A.9.4.

When verifying the CPICH Ec/Io inter frequency relative accuracy requirement both cell 1 and 2 in table A.9.4 shall be present.

Table A.9.4: CPICH Ec/Io Inter frequency tests parameters

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
Îor/Ioc	dB	10.1	10.1
Ioc	dBm/ 3.84 MHz	*Io -10.6 dB = Ioc*, Note 1	*Io -10.6 dB = Ioc*, Note 1
Range 1:Io Range 2: Io	dBm	-94…-70 -94…-50	-94…-70 -94…-50
Propagation condition	-	AWGN	
NOTE 1: *Ioc* level shall be adjusted in each carrier frequency according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.			

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2	Channel 1	Channel 2	Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15	
DPCH_Ec/Ior	dB	-15	-	-6	-	-6	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-2.56	-0.94	-2.56	-0.94
Ioc	dBm/ 3.84 MHz	-52.22	-52.22	-87.27	-87.27	-94.46	-94.46
Îor/Ioc	dB	-1.75	-1.75	-4.7	-4.7	-9.54	-9.54
CPICH Ec/Io, Note 1	dBm	-14.0	-14.0	-16.0	-16.0	-20.0	-20.0
Io, Note 1	dBm	-50	-50	-86	-86	-94	-94
Propagation condition	-	AWGN		AWGN		AWGN	
NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.							

A.9.1.2.2 Test Requirements

The CPICH Ec/Io measurement accuracy shall meet the requirements in section 9.1.2. In case of the absolute CPICH_Ec/Io measurement accuracy and relative inter-frequency CPICH_Ec/Io measurement accuracy test cases the effect of assumed thermal noise and noise generated in the receiver (–99 dBm) shall be added into the required accuracy defined in Section 9.1.2 as shown in Table A.9.4A.

Table A.9.4A: CPICH_Ec/Io Intra and Inter frequency absolute accuracy and CPICH_Ec/Io Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	-2.7…1.5 for -14 ≤ CPICH Ec/Io –3.2…2 for -16 ≤ CPICH Ec/Io < -14 –4.2…3 for -20 ≤ CPICH Ec/Io < -16	-4.2…3	-94...-87
		± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-87...-50

A.9.1.3 UTRA Carrier RSSI

A.9.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UTRA Carrier RSSI measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.3. UTRA Carrier RSSI accuracy requirements are tested by using test parameters in Table A.9.5.

~~Table A.9.5 defines the limits of signal strengths, where the requirement is applicable.~~

~~When verifying the UTRA Carrier RSSI absolute accuracy requirement only cell 1 in table A.9.5 shall be present. When verifying the UTRA Carrier RSSI relative accuracy requirement both cell 1 and 2 in table A.9.5 shall be present.~~

Table A.9.5: UTRA Carrier RSSI Inter frequency test parameters

~~Parameter~~	~~Unit~~	~~Cell 1~~	~~Cell 2~~
~~UTRA RF Channel number~~	~~-~~	~~Channel 1~~	~~Channel 2~~
~~Îor/Ioc~~	~~dB~~	~~-1~~	~~-1~~
~~Ioc~~	~~dBm/ 3.84 MHz~~	~~*Io -4.13 dB = Ioc,* Note 1~~	~~*Io -4.13 dB = Ioc,* Note 1~~
~~Range 1: Io Range 2: Io~~	~~dBm/ 3.84 MHz~~	~~-94… 70 -94…-50~~	~~-94… 70 -94…-50~~
~~Propagation condition~~	~~-~~	~~AWGN~~	
~~NOTE 1: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.~~			

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2	Channel 1	Channel 2	Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15	
DPCH_Ec/Ior	dB	-15	-	-6	-	-6	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-2.56	-0.94	-2.56	-0.94
Ioc	dBm/ 3.84 MHz	-52.22	-52.22	-70.27	-70.27	-94.46	-94.46
Îor/Ioc	dB	-1.75	-1.75	-4.7	-4.7	-9.54	-9.54
CPICH Ec/Io, Note 1	dBm	-14.0	-14.0	-16.0	-16.0	-20.0	-20.0
Io, Note 1	dBm	-50	-50	-69	-69	-94	-94
Propagation condition	-	AWGN		AWGN		AWGN	
NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.							

A.9.1.3.2 Test Requirements

The UTRA Carrier RSSI measurement accuracy shall meet the requirements in section 9.1.3. The effect of assumed thermal noise and noise generated in the receiver (–99 dBm) shall be added into the required accuracy defined in Section 9.1.2 as shown in Table A.9.5A.

Table A.9.5A: UTRA Carrier RSSI absolute and relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
UTRA Carrier RSSI	dBm	-4…5.2	-7…8.2	-94…-87
	dBm	± 4	± 7	-87…-70
	dBm	± 6	± 9	-70…-50

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CR-Form-v4

CHANGE REQUEST

⌘ **25.133** **CR** **215** ⌘ ev ⌘ Current version: **4.2.0** ⌘

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

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

Title:	⌘	Requirements and test parameters for UE measurements
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 2001-11-15
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)*

Reason for change: ⌘ At the RAN4, RAN2 and T1/RF joint meeting on RRM testing in Berlin 07/2001 it was agreed that Io conditions of accuracy requirements of some UE measurements e.g., CPICH RSCP measurement needs to be clarified to avoid more misunderstandings.

At the same meeting it was also agreed that RAN WG4 should define test conditions for some UE measurements e.g., CPICH RSCP and CPICH Ec/Io measurements in more detail

Summary of change: ⌘ 1) Io conditions have been clarified for the accuracy requirements of following measurements

- CPICH RSCP intra frequency measurements
- UTRA Carrier RSSI measurements
- P-CCPCH RSCP measurements

Instead of having two ranges for Io conditions –94 dBm…-70dBm and –94 dbm…-50 dBm the new ranges are –94 dBm…–70 dBm and –70 dBm…50 dBm.

2) An obvious typo for Io conditions for UTRA Carrier RSSI relative measurements has been corrected from –94 dBm … -70 dBm to –94 dBm … -50 dBm.

3) New test parameters for the CPICH RSCP, CPICH Ec/Io and UTRA Carrier RSSI measurements have been defined. Test parameters have been chosen using the following strategy:

- Tests are performed at both ends of specified Io conditions i.e. at –50 dBm and –94 dBm. Measurements are also performed at –69 dBm in tests where accuracy requirement changes at –70 dBm.
- Side conditions of related measurements are always fulfilled. In many

tests side conditions are just barely met. For example in some CPICH RSCP tests cases an absolute CPICH RSCP value have been –114 dBm, which is the lowest possible allowed by side conditions. Also CPICH_Ec/Io have been very close to –20 dBm in many measurements. The purpose of choosing tests parameters this way is to validate measurement capability in worst case conditions.

- The higher Io value is the higher Îor/Ioc value is specified
- The UE is not in SHO during the tests
- CPICH Ec/Io measurements tests are validating the accuracy for each specified accuracy category.
- DPCH_Ec/Ior level have been increased in some tests cases in order to have reasonable quality at DPCH in downlink.
- Test 1 of proposed CPICH RSCP and CPICH_Ec/Io tests fulfils also the side condition for SCH_Ec/Io which is defined for identification of a new intra or inter frequency cell.
- A note has been added to test tables that tests needs to be done sequentially and that tests parameters needs to be changed within 5 seconds. This is because in tests 2 and 3 SCH_Ec/Io for cell 2 may be below the specified identification limits. Thus when tests parameters are changed quickly UE will not loose the cell 2 during the time when tests parameters are being changed.

4) It has been clarified that compressed mode pattern set 1of Table A.22 in TS 25.101 is being used for inter frequency CPICH RSCP and CPICH Ec/Io tests

5) Since in tests a test equipment does not know the effect of thermal noise and noise generated in the receiver, the required accuracy on Io levels of -94…-87 dBm is relaxed in some of the CPICH Ec/Io and UTRA carrier RSSI tests by the impact of assumed thermal noise and noise generated in the receiver (–99 dBm). The modified tests are CPICH_Ec/Io Intra and Inter frequency absolute accuracy, CPICH_Ec/Io Inter frequency relative accuracy and UTRA Carrier RSSI absolute and relative accuracy tests.

Isolated Impact Analysis:

The proposed corrections are testing related and they do not change the behaviour of the UE. Hence, the changes do not affect the implementation.

Consequences if not approved:	⌘	Misunderstandings of Io conditions exists. Test parameters for CPICH RSCP, CPICH Ec/Io and UTRA Carrier RSSI are inadequate. Testing of CPICH_Ec/Io Intra and Inter frequency absolute accuracy, CPICH_Ec/Io Inter frequency relative accuracy and UTRA Carrier RSSI absolute and relative accuracy is not possible since a test equipment does not know thermal noise and noise generated in the receiver.

Clauses affected:	⌘	9.1.3.1, 9.1.3.2, A.9.1.1.1.1, A.9.1.1.1.2, A.9.1.2.1.1, A.9.1.2.1.2, A.9.1.2.2, A.9.1.3.1 and A.9.1.3.2		
Other specs affected:	⌘	[ ] Other core specifications [X] Test specifications [ ] O&M Specifications	⌘	34.121
Other comments:	⌘	It has been assumed that RAN WG1 will change the definition of UTRA Carrier RSSI and CPICH Ec/Io measurements so that thermal noise and noise generated in the receiver is included into UTRA Carrier RSSI and CPICH_Ec/Io measurements.		

9 Measurements Performance Requirements

One of the key services provided by the physical layer is the measurement of various quantities which are used to trigger or perform a multitude of functions. Both the UE and the UTRAN are required to perform a variety of measurements. The physical layer measurement model and a complete list of measurements is specified in TS 25.302 "Services Provided by Physical Layer". The physical layer measurements for FDD are described and defined in TS25.215 "Physical layer - Measurements (FDD)". In this clause for each measurement the relevant requirements on the measurement period, reporting range, granularity and performance in terms of accuracy are specified.

The accuracy requirements in this clause are applicable for AWGN radio propagation conditions.

9.1 Measurement Performance for UE

The requirements in this clause are applicable for a UE:

- in state CELL_DCH and state CELL_FACH.
- performing measurements according to section 8.
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in TS25.302.

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

Note: It needs to be clarified how the accuracy requirements shall be handled when the UE is measuring on cells using IPDL.

9.1.1 CPICH RSCP

Note: This measurement is for handover evaluation, DL open loop power control, UL open loop power control and for the calculation of pathloss.

9.1.1.1 Intra frequency measurements accuracy

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.2. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.2.

9.1.1.1.1 Absolute accuracy requirement

The accuracy requirements in table 9.1 are valid under the following conditions:

$CPICH\_RSCP1|_{dBm} \geq$ -114 dBm.

$$\left.\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}}\right)_{in\ dB} \leq 20dB$$

Table 9.1: CPICH_RSCP Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_RSCP	dBm	± 6	± 9	-94...-70
	dBm	± 8	± 11	-7094...-50

9.1.1.1.2 Relative accuracy requirement

The relative accuracy of CPICH RSCP is defined as the CPICH RSCP measured from one cell compared to the CPICH RSCP measured from another cell on the same frequency

The accuracy requirements in table 9.2 are valid under the following conditions:

CPICH_RSCP1,2$|_{dBm}$ ≥ -114 dBm.

$$\left| CPICH\_RSCP1\big|_{in\ dBm} - CPICH\_RSCP2\big|_{in\ dBm} \right| \le 20dB$$

$$\left. \frac{I_o}{\left(\hat{I}_{or}\right)} \right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}} \right)_{in\ dB} \le 20dB$$

Table 9.2: CPICH_RSCP Intra frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_RSCP	dBm	± 3	± 3	-94...-50

9.1.1.2 Inter frequency measurement accuracy

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.3. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.3.

9.1.1.2.1 Relative accuracy requirement

The relative accuracy of CPICH RSCP in inter frequency case is defined as the CPICH RSCP measured from one cell compared to the CPICH RSCP measured from another cell on a different frequency.

The accuracy requirements in table 9.3 are valid under the following conditions:

CPICH_RSCP1,2$|_{dBm}$ ≥ -114 dBm.

$$\left| CPICH\_RSCP1\big|_{in\ dBm} - CPICH\_RSCP2\big|_{in\ dBm} \right| \le 20dB$$

| Channel 1_Io$|_{dBm}$ -Channel 2_Io$|_{dBm}$| ≤ 20 dB.

$$\left. \frac{I_o}{\left(\hat{I}_{or}\right)} \right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}} \right)_{in\ dB} \le 20dB$$

Table 9.3: CPICH_RSCP Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_RSCP	dBm	± 6	± 6	-94...-50

9.1.1.3 CPICH RSCP measurement report mapping

The reporting range is for *CPICH RSCP* is from 115 ...-25 dBm.

In table 9.4 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.4

Reported value	Measured quantity value	Unit
CPICH_RSCP_LEV _00	CPICH RSCP <-115	dBm
CPICH_RSCP_LEV _01	-115 ≤ CPICH RSCP < -114	dBm
CPICH_RSCP_LEV _02	-114 ≤ CPICH RSCP < -113	dBm
…	…	…
CPICH_RSCP_LEV _89	-27 ≤ CPICH RSCP < -26	dBm
CPICH_RSCP_LEV _90	-26 ≤ CPICH RSCP < -25	dBm
CPICH_RSCP_LEV _91	-25 ≤ CPICH RSCP	dBm

9.1.2 CPICH Ec/Io

Note: This measurement is for Cell selection/re-selection and for handover evaluation.

9.1.2.1 Intra frequency measurements accuracy

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.2. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.2.

9.1.2.1.1 Absolute accuracy requirement

The accuracy requirements in table 9.5 are valid under the following conditions:

CPICH_RSCP1$|_{dBm}$ ≥ -114 dBm.

$$\left| \frac{I_o}{\left(\hat{I}_{or}\right)} \right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}} \right)_{in\ dB} \leq 20dB$$

Table 9.5: CPICH_Ec/Io Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50

9.1.2.1.2 Relative accuracy requirement

The relative accuracy of CPICH Ec/Io is defined as the CPICH Ec/Io measured from one cell compared to the CPICH Ec/Io measured from another cell on the same frequency.

The accuracy requirements in table 9.6 are valid under the following conditions:

CPICH_RSCP1,2$|_{dBm}$ ≥ -114 dBm.

$$\left| CPICH\_RSCP1|_{in\ dBm} - CPICH\_RSCP2|_{in\ dBm} \right| \leq 20dB$$

$$\left| \frac{I_o}{\left(\hat{I}_{or}\right)} \right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}} \right)_{in\ dB} \leq 20dB$$

Table 9.6: CPICH_Ec/Io Intra frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50

9.1.2.2 Inter frequency measurement accuracy

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.3. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.3.

9.1.2.2.1 Absolute accuracy requirement

The accuracy requirements in table 9.7 are valid under the following conditions:

CPICH_RSCP1$|_{dBm}$ ≥ -114 dBm.

$$\left.\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}}\right)_{in\ dB} \leq 20dB$$

Table 9.7: CPICH_Ec/Io Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50

9.1.2.2.2 Relative accuracy requirement

The relative accuracy of CPICH Ec/Io in the inter frequency case is defined as the CPICH Ec/Io measured from one cell compared to the CPICH Ec/Io measured from another cell on a different frequency

The accuracy requirements in table 9.8 are valid under the following conditions:

CPICH_RSCP1,2$|_{dBm}$ ≥ -114 dBm.

$$\left|CPICH\_RSCP1|_{in\ dBm} - CPICH\_RSCP2|_{in\ dBm}\right| \leq 20dB$$

| Channel 1_Io$|_{dBm}$ -Channel 2_Io$|_{dBm}$| ≤ 20 dB.

$$\left.\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}}\right)_{in\ dB} \leq 20dB$$

Table 9.8: CPICH_Ec/Io Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50

9.1.2.3 CPICH Ec/Io measurement report mapping

The reporting range is for *CPICH Ec/Io* is from -24 ...0 dB.

In table 9.9 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.9

Reported value	Measured quantity value	Unit
CPICH_Ec/No _00	CPICH Ec/Io < -24	dB
CPICH_Ec/No _01	-24 ≤ CPICH Ec/Io < -23.5	dB
CPICH_Ec/No _02	-23.5 ≤ CPICH Ec/Io < -23	dB
…	…	…
CPICH_Ec/No _47	-1 ≤ CPICH Ec/Io < -0.5	dB
CPICH_Ec/No _48	-0.5 ≤ CPICH Ec/Io < 0	dB
CPICH_Ec/No _49	0 ≤ CPICH Ec/Io	dB

9.1.3 UTRA Carrier RSSI

NOTE: This measurement is for Inter-frequency handover evaluation.

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.2 for intra frequency measurements and in sub clause 8.1.2.2 for inter frequency measurements. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.2 for intra frequency measurements and in sub clause 8.4.2.3 for inter frequency measurements.

9.1.3.1 Absolute accuracy requirement

Table 9.10: UTRA Carrier RSSI~~Io~~ Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
UTRA Carrier RSSI~~Io~~	dBm	± 4	± 7	-94...-70
	dBm	± 6	± 9	-70~~94~~...-50

9.1.3.2 Relative accuracy requirement

The relative accuracy requirement is defined as the UTRAN RSSI measured from one frequency compared to the UTRAN RSSI measured from another frequency.

The accuracy requirements in table 9.11 are valid under the following condition:

$| \text{Channel 1\_Io}|_{\text{dBm}} - \text{Channel 2\_Io}|_{\text{dBm}} | < 20$ dB.

Table 9.11: UTRA Carrier RSSI~~Io~~ Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
UTRA Carrier RSSI~~Io~~	dBm	± 7	± 11	-94...-70

9.1.3.3 UTRA Carrier RSSI measurement report mapping

The reporting range for *UTRA carrier RSSI* is from -100 ...-25 dBm.

In table 9.12 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.12

Reported value	Measured quantity value	Unit
UTRA_carrier_RSSI_LEV _00	UTRA carrier RSSI < -100	DBm
UTRA_carrier_RSSI_LEV _01	-100 ≤ UTRA carrier RSSI < -99	DBm
UTRA_carrier_RSSI_LEV _02	-99 ≤ UTRA carrier RSSI < -98	DBm
…	…	…
UTRA_carrier_RSSI_LEV _74	-27 ≤ UTRA carrier RSSI < -26	DBm
UTRA_carrier_RSSI_LEV _75	-26 ≤ UTRA carrier RSSI < -25	DBm
UTRA_carrier_RSSI_LEV _76	-25 ≤ UTRA carrier RSSI	dBm

9.1.11 P-CCPCH RSCP

NOTE: This measurement is used for handover between UTRA FDD and UTRA TDD.

The requirements in this section are valid for terminals supporting this capability.

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.4. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.4.

9.1.11.1 Absolute accuracy requirements

The accuracy requirement in table 9.31is valid under the following conditions:

P-CCPCH_RSCP ≥ -102 dBm.

$$\left|\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left(\frac{P-CCPCH\_E_c}{I_{or}}\right)_{in\ dB} \leq 8dB$$

Table 9.31: P-CCPCH_RSCP Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal conditions	Extreme conditions	Io [dBm]
P-CCPCH_RSCP	DBm	± 6	± 9	-94...-70
	DBm	± 8	± 11	-7094...-50

9.1.11.2 P-CCPCH RSCP measurement report mapping

The reporting range is for *P-CCPCH RSCP* is from -115 ... -25 dBm.

In table 9.32 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.32

Reported value	Measured quantity value	Unit
PCCPCH_RSCP_LEV _00	PCCPCH RSCP< -115	dBm
PCCPCH_RSCP_LEV _01	-115 ≤ PCCPCH RSCP< -114	dBm
PCCPCH_RSCP_LEV _02	-114 ≤ PCCPCH RSCP< -113	dBm
PCCPCH_RSCP_LEV _03	-113 ≤ PCCPCH RSCP< -112	dBm
…	…	…
PCCPCH_RSCP_LEV _89	-27 ≤ PCCPCH RSCP< -26	dBm
PCCPCH_RSCP_LEV _90	-26 ≤ PCCPCH RSCP< -25	dBm
PCCPCH_RSCP_LEV _91	-25 ≤ PCCPCH RSCP	dBm

A.9 Measurement Performance Requirements

Unless explicitly stated:

- Reported measurements shall be within defined range in 90 % of the cases.
- Measurement channel is 12.2 kbps as defined in TS 25.101 annex A, sub-clause A.3.1. This measurement channel is used both in active cell and cells to be measured.
- Physical channels used as defined in TS 25.101 annex C.
- Cell 1 is the active cell.
- Single task reporting.
- Power control is active.

A.9.1 Measurement Performance for UE

A.9.1.1 CPICH RSCP

A.9.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH RSCP measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.1.

A.9.1.1.1.1 Intra frequency test parameters

In this case all cells are on the same frequency. ~~Table A.9.1 defines the limits of signal strengths and code powers, when the requirements are applicable.~~ Both CPICH RSCP intra frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.1.

~~When verifying the CPICH RSCP intra frequency absolute accuracy requirement only cell 1 in table A.9.1 shall be present. When verifying the CPICH RSCP intra frequency relative accuracy requirement both cell 1 and 2 in table A.9.1 shall be present.~~

Table A.9.1: CPICH RSCP Intra frequency test parameters

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 1
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
Îor/Ioc	dB	10.5	10.5
Ioc	dBm/ 3.84 MHz	*Io -13.7 dB = Ioc*, Note 1	*Io -13.7 dB = Ioc*, Note 1
Range 1:Io Range 2: Io	dBm	-94…-70 -94… 50	-94…-70 -94… 50
Propagation condition	-	AWGN	
NOTE 1: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.			

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1		Channel 1		Channel 1	
CPICH_Ec/Ior	dB	-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15	
DPCH_Ec/Ior	dB	-15	-	-15	-	-15	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-1.11	-0.94	-1.11	-0.94
Ioc	dBm/ 3.84 MHz	-75.54		-59.98		-97.52	
Îor/Ioc	dB	4	0	9	0	0	-6.53
CPICH RSCP, Note 1	dBm	-81.5	-85.5	-60.98	-69.88	-107.5	-114.0
Io, Note 1	dBm	-69		-50		-94	
Propagation condition	-	AWGN		AWGN		AWGN	
NOTE 1: CPICH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.							

A.9.1.1.1.2 Inter frequency test parameters

In this case both cells are on different frequencies and compressed mode is applied. The gap length is 7, detailed definition is in TS 25.101 annex A.5, Set 1 of Table A.22 [14 slots is FSS]. Table A.9.2 defines the limits of signal strengths and code powers, where the requirement is applicable.CPICH RSCP inter frequency relative accuracy requirements are tested by using test parameters in Table A.9.2.

When verifying the CPICH RSCP inter frequency relative accuracy requirement both cell 1 and 2 in table A.9.2 shall be present.

Table A.9.2: CPICH RSCP Inter frequency tests parameters

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
Îor/Ioc	dB	10.1	10.1
Ioc	dBm/ 3.84 MHz	*Io -10.6 dB = Ioc*, Note 1	*Io -10.6 dB = Ioc*, Note 1
Range 1:Io Range 2: Io	dBm	-94… 70 -94…-50	-94… 70 -94…-50
Propagation condition	-	AWGN	
NOTE 1: *Ioc* level shall be adjusted in each carrier frequency according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.			

Parameter	Unit	Test 1		Test 2	
		Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2	Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12	
SCH_Ec/Ior	dB	-12		-12	
PICH_Ec/Ior	dB	-15		-15	
DPCH_Ec/Ior	dB	-15	-	-15	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-1.11	-0.94
Ioc	dBm/ 3.84 MHz	-60.00	-60.00	-84.00	-94.46
Îor/Ioc	dB	9.54	9.54	0	-9.54
CPICH RSCP, Note 1	dBm	-60.46	-60.46	-94.0	-114.0
Io, Note 1	dBm	-50.00	-50.00	-81.0	-94.0
Propagation condition	-	AWGN		AWGN	
NOTE 1: CPICH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.					
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for test 2 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.					

A.9.1.1.2 Test Requirements

The CPICH RSCP measurement accuracy shall meet the requirements in section 9.1.1.

A.9.1.2 CPICH Ec/Io

A.9.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH Ec/Io measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.2.

A.9.1.2.1.1 Intra frequency test parameters

In this case all cells are in the same frequency. Table A.9.3 defines the limits of signal strengths and code powers, where the requirements are applicable.Both CPICH Ec/Io absolute and relative accuracy requirements are tested by using test parameters in Table A.9.3

When verifying the CPICH Ec/Io intra frequency absolute accuracy requirement only cell 1 in table A.9.3 shall be present. When verifying the CPICH Ec/Io intra frequency relative accuracy requirement both cell 1 and 2 in table A.9.3 shall be present.

Table A.9.3: CPICH Ec/Io Intra frequency test parameters

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 1
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
Îor/Ioc	dB	10.5	10.5
Ioc	dBm/ 3.84 MHz	*Io -13.7 dB = Ioc*, Note 1	*Io -13.7 dB = Ioc*, Note 1
Range 1:Io Range 2: Io	dBm	-94…-70 -94…-50	-94…-70 -94…-50
Propagation condition	-	AWGN	
NOTE 1: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.			

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1		Channel 1		Channel 1	
CPICH_Ec/Ior	dB	-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15	
DPCH_Ec/Ior	dB	-15	-	-15	-	-6	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-1.11	-0.94	.2.56	-0.94
Ioc	dBm/ 3.84 MHz	-56.98		-89.07		-94.98	
Îor/Ioc	dB	3.0	3.0	-2.9	-2.9	-9.0	-9.0
CPICH Ec/Io, Note 1	dBm	-14.0	-14.0	-16.0	-16.0	-20.0	-20.0
Io, Note 1	dBm	-50		-86		-94	
Propagation condition	-	AWGN		AWGN		AWGN	
NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.							

A.9.1.2.1.2 Inter frequency test parameters

In this case both cells are in different frequency and compressed mode is applied. The gap length is 7, detailed definition is in TS 25.101 annex A.5, Set 1 of Table A.22 [14 slots is FSS]. Table A.9.4 defines the limits of signal strengths and code powers, where the requirement is applicable.CPICH Ec/Io inter frequency relative accuracy requirements are tested by using test parameters in Table A.9.4.

When verifying the CPICH Ec/Io inter frequency relative accuracy requirement both cell 1 and 2 in table A.9.4 shall be present.

Table A.9.4: CPICH Ec/Io Inter frequency tests parameters

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
Îor/Ioc	dB	10.1	10.1
Ioc	dBm/ 3.84 MHz	*Io -10.6 dB = Ioc*, Note 1	*Io -10.6 dB = Ioc*, Note 1
Range 1:Io Range 2: Io	dBm	-94…-70 -94…-50	-94…-70 -94…-50
Propagation condition	-	AWGN	
NOTE 1: *Ioc* level shall be adjusted in each carrier frequency according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.			

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2	Channel 1	Channel 2	Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15	
DPCH_Ec/Ior	dB	-15	-	-6	-	-6	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-2.56	-0.94	-2.56	-0.94
Ioc	dBm/ 3.84 MHz	-52.22	-52.22	-87.27	-87.27	-94.46	-94.46
Îor/Ioc	dB	-1.75	-1.75	-4.7	-4.7	-9.54	-9.54
CPICH Ec/Io, Note 1	dBm	-14.0	-14.0	-16.0	-16.0	-20.0	-20.0
Io, Note 1	dBm	-50	-50	-86	-86	-94	-94
Propagation condition	-	AWGN		AWGN		AWGN	
NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.							

A.9.1.2.2 Test Requirements

The CPICH Ec/Io measurement accuracy shall meet the requirements in section 9.1.2. In case of the absolute CPICH_Ec/Io measurement accuracy and relative inter-frequency CPICH_Ec/Io measurement accuracy test cases the effect of assumed thermal noise and noise generated in the receiver (–99 dBm) shall be added into the required accuracy defined in Section 9.1.2 as shown in Table A.9.4A.

Table A.9.4A: CPICH_Ec/Io Intra and Inter frequency absolute accuracy and CPICH_Ec/Io Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	-2.7…1.5 for -14 ≤ CPICH Ec/Io –3.2…2 for -16 ≤ CPICH Ec/Io < -14 –4.2…3 for -20 ≤ CPICH Ec/Io < -16	-4.2…3	-94...-87
		± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-87...-50

A.9.1.3 UTRA Carrier RSSI

A.9.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UTRA Carrier RSSI measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.3. UTRA Carrier RSSI accuracy requirements are tested by using test parameters in Table A.9.5.

~~Table A.9.5 defines the limits of signal strengths, where the requirement is applicable.~~

~~When verifying the UTRA Carrier RSSI absolute accuracy requirement only cell 1 in table A.9.5 shall be present. When verifying the UTRA Carrier RSSI relative accuracy requirement both cell 1 and 2 in table A.9.5 shall be present.~~

Table A.9.5: UTRA Carrier RSSI Inter frequency test parameters

~~Parameter~~	~~Unit~~	~~Cell 1~~	~~Cell 2~~
~~UTRA RF Channel number~~	~~-~~	~~Channel 1~~	~~Channel 2~~
~~$\hat{I}or/Ioc$~~	~~dB~~	~~-1~~	~~-1~~
~~Ioc~~	~~dBm/ 3.84 MHz~~	~~*Io -4.13 dB = Ioc,* Note 1~~	~~*Io -4.13 dB = Ioc,* Note 1~~
~~Range 1: Io Range 2: Io~~	~~dBm/ 3.84 MHz~~	~~-94… 70 -94…-50~~	~~-94… 70 -94…-50~~
~~Propagation condition~~	~~-~~	~~AWGN~~	
~~NOTE 1: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *$\hat{I}or/Ioc$*.~~			

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2	Channel 1	Channel 2	Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15	
DPCH_Ec/Ior	dB	-15	-	-6	-	-6	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-2.56	-0.94	-2.56	-0.94
Ioc	dBm/ 3.84 MHz	-52.22	-52.22	-70.27	-70.27	-94.46	-94.46
$\hat{I}or/Ioc$	dB	-1.75	-1.75	-4.7	-4.7	-9.54	-9.54
CPICH Ec/Io, Note 1	dBm	-14.0	-14.0	-16.0	-16.0	-20.0	-20.0
Io, Note 1	dBm	-50	-50	-69	-69	-94	-94
Propagation condition	-	AWGN		AWGN		AWGN	
NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.							

A.9.1.3.2 Test Requirements

The UTRA Carrier RSSI measurement accuracy shall meet the requirements in section 9.1.3. The effect of assumed thermal noise and noise generated in the receiver (–99 dBm) shall be added into the required accuracy defined in Section 9.1.2 as shown in Table A.9.5A.

Table A.9.5A: UTRA Carrier RSSI absolute and relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
UTRA Carrier RSSI	dBm	-4…5.2	-7…8.2	-94…-87
	dBm	± 4	± 7	-87…-70
	dBm	± 6	± 9	-70…-50

3GPP TSG RAN WG4 Meeting #20 **R4-011639**

East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133** **CR** **216** ⌘ ev ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	Requirements and test parameters for UE measurements
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 2001-11-15
Category:	⌘ **A**	***Release:*** ⌘ Rel-5

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

Use one of the following releases:

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

Reason for change: ⌘ At the RAN4, RAN2 and T1/RF joint meeting on RRM testing in Berlin 07/2001 it was agreed that Io conditions of accuracy requirements of some UE measurements e.g., CPICH RSCP measurement needs to be clarified to avoid more misunderstandings.

At the same meeting it was also agreed that RAN WG4 should define test conditions for some UE measurements e.g., CPICH RSCP and CPICH Ec/Io measurements in more detail

Summary of change: ⌘ 1) Io conditions have been clarified for the accuracy requirements of following measurements

- CPICH RSCP intra frequency measurements
- UTRA Carrier RSSI measurements
- P-CCPCH RSCP measurements

Instead of having two ranges for Io conditions –94 dBm…-70dBm and –94 dbm…-50 dBm the new ranges are –94 dBm…–70 dBm and –70 dBm…50 dBm.

2) An obvious typo for Io conditions for UTRA Carrier RSSI relative measurements has been corrected from –94 dBm … -70 dBm to –94 dBm … -50 dBm.

3) New test parameters for the CPICH RSCP, CPICH Ec/Io and UTRA Carrier RSSI measurements have been defined. Test parameters have been chosen using the following strategy:

- Tests are performed at both ends of specified Io conditions i.e. at –50 dBm and –94 dBm. Measurements are also performed at –69 dBm in tests where accuracy requirement changes at –70 dBm.
- Side conditions of related measurements are always fulfilled. In many

tests side conditions are just barely met. For example in some CPICH RSCP tests cases an absolute CPICH RSCP value have been –114 dBm, which is the lowest possible allowed by side conditions. Also CPICH_Ec/Io have been very close to –20 dBm in many measurements. The purpose of choosing tests parameters this way is to validate measurement capability in worst case conditions.

- The higher Io value is the higher Îor/Ioc value is specified
- The UE is not in SHO during the tests
- CPICH Ec/Io measurements tests are validating the accuracy for each specified accuracy category.
- DPCH_Ec/Ior level have been increased in some tests cases in order to have reasonable quality at DPCH in downlink.
- Test 1 of proposed CPICH RSCP and CPICH_Ec/Io tests fulfils also the side condition for SCH_Ec/Io which is defined for identification of a new intra or inter frequency cell.
- A note has been added to test tables that tests needs to be done sequentially and that tests parameters needs to be changed within 5 seconds. This is because in tests 2 and 3 SCH_Ec/Io for cell 2 may be below the specified identification limits. Thus when tests parameters are changed quickly UE will not loose the cell 2 during the time when tests parameters are being changed.

4) It has been clarified that compressed mode pattern set 1of Table A.22 in TS 25.101 is being used for inter frequency CPICH RSCP and CPICH Ec/Io tests

5) Since in tests a test equipment does not know the effect of thermal noise and noise generated in the receiver, the required accuracy on Io levels of -94…-87 dBm is relaxed in some of the CPICH Ec/Io and UTRA carrier RSSI tests by the impact of assumed thermal noise and noise generated in the receiver (–99 dBm). The modified tests are CPICH_Ec/Io Intra and Inter frequency absolute accuracy, CPICH_Ec/Io Inter frequency relative accuracy and UTRA Carrier RSSI absolute and relative accuracy tests.

Consequences if not approved:	⌘	Misunderstandings of Io conditions exists. Test parameters for CPICH RSCP, CPICH Ec/Io and UTRA Carrier RSSI are inadequate. Testing of CPICH_Ec/Io Intra and Inter frequency absolute accuracy, CPICH_Ec/Io Inter frequency relative accuracy and UTRA Carrier RSSI absolute and relative accuracy is not possible since a test equipment does not know thermal noise and noise generated in the receiver.

Clauses affected:	⌘	9.1.3.1, 9.1.3.2, A.9.1.1.1.1, A.9.1.1.1.2, A.9.1.2.1.1, A.9.1.2.1.2, A.9.1.2.2, A.9.1.3.1 and A.9.1.3.2		
Other specs affected:	⌘	[ ] Other core specifications [X] Test specifications [ ] O&M Specifications	⌘	34.121
Other comments:	⌘	It has been assumed that RAN WG1 will change the definition of UTRA Carrier RSSI and CPICH Ec/Io measurements so that thermal noise and noise generated in the receiver is included into UTRA Carrier RSSI and CPICH_Ec/Io measurements.		

9 Measurements Performance Requirements

One of the key services provided by the physical layer is the measurement of various quantities which are used to trigger or perform a multitude of functions. Both the UE and the UTRAN are required to perform a variety of measurements. The physical layer measurement model and a complete list of measurements is specified in TS 25.302 "Services Provided by Physical Layer". The physical layer measurements for FDD are described and defined in TS25.215 "Physical layer - Measurements (FDD)". In this clause for each measurement the relevant requirements on the measurement period, reporting range, granularity and performance in terms of accuracy are specified.

The accuracy requirements in this clause are applicable for AWGN radio propagation conditions.

9.1 Measurement Performance for UE

The requirements in this clause are applicable for a UE:

- in state CELL_DCH and state CELL_FACH.
- performing measurements according to section 8.
- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in TS25.302.

The accuracy requirements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

Note: It needs to be clarified how the accuracy requirements shall be handled when the UE is measuring on cells using IPDL.

9.1.1 CPICH RSCP

Note: This measurement is for handover evaluation, DL open loop power control, UL open loop power control and for the calculation of pathloss.

9.1.1.1 Intra frequency measurements accuracy

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.2. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.2.

9.1.1.1.1 Absolute accuracy requirement

The accuracy requirements in table 9.1 are valid under the following conditions:

$CPICH\_RSCP1|_{dBm} \geq$ -114 dBm.

$$\left| \frac{I_o}{\hat{I}_{or}} \right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}} \right)_{in\ dB} \leq 20dB$$

Table 9.1: CPICH_RSCP Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_RSCP	dBm	± 6	± 9	-94...-70
	dBm	± 8	± 11	-7094...-50

9.1.1.1.2 Relative accuracy requirement

The relative accuracy of CPICH RSCP is defined as the CPICH RSCP measured from one cell compared to the CPICH RSCP measured from another cell on the same frequency

The accuracy requirements in table 9.2 are valid under the following conditions:

CPICH_RSCP1,2$|_{dBm}$ ≥ -114 dBm.

$$\left| CPICH\_RSCP1\big|_{in\ dBm} - CPICH\_RSCP2\big|_{in\ dBm} \right| \le 20dB$$

$$\left. \frac{I_o}{\left(\hat{I}_{or}\right)} \right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}} \right)_{in\ dB} \le 20dB$$

Table 9.2: CPICH_RSCP Intra frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_RSCP	dBm	± 3	± 3	-94...-50

9.1.1.2 Inter frequency measurement accuracy

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.3. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.3.

9.1.1.2.1 Relative accuracy requirement

The relative accuracy of CPICH RSCP in inter frequency case is defined as the CPICH RSCP measured from one cell compared to the CPICH RSCP measured from another cell on a different frequency.

The accuracy requirements in table 9.3 are valid under the following conditions:

CPICH_RSCP1,2$|_{dBm}$ ≥ -114 dBm.

$$\left| CPICH\_RSCP1\big|_{in\ dBm} - CPICH\_RSCP2\big|_{in\ dBm} \right| \le 20dB$$

| Channel 1_Io$|_{dBm}$ -Channel 2_Io$|_{dBm}$| ≤ 20 dB.

$$\left. \frac{I_o}{\left(\hat{I}_{or}\right)} \right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}} \right)_{in\ dB} \le 20dB$$

Table 9.3: CPICH_RSCP Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_RSCP	dBm	± 6	± 6	-94...-50

9.1.1.3 CPICH RSCP measurement report mapping

The reporting range is for *CPICH RSCP* is from 115 ...-25 dBm.

In table 9.4 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.4

Reported value	Measured quantity value	Unit
CPICH_RSCP_LEV _00	CPICH RSCP <-115	dBm
CPICH_RSCP_LEV _01	-115 ≤ CPICH RSCP < -114	dBm
CPICH_RSCP_LEV _02	-114 ≤ CPICH RSCP < -113	dBm
…	…	…
CPICH_RSCP_LEV _89	-27 ≤ CPICH RSCP < -26	dBm
CPICH_RSCP_LEV _90	-26 ≤ CPICH RSCP < -25	dBm
CPICH_RSCP_LEV _91	-25 ≤ CPICH RSCP	dBm

9.1.2 CPICH Ec/Io

Note: This measurement is for Cell selection/re-selection and for handover evaluation.

9.1.2.1 Intra frequency measurements accuracy

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.2. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.2.

9.1.2.1.1 Absolute accuracy requirement

The accuracy requirements in table 9.5 are valid under the following conditions:

CPICH_RSCP1$|_{dBm}$ ≥ -114 dBm.

$$\left| \frac{I_o}{\left(\hat{I}_{or}\right)} \right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}} \right)_{in\ dB} \leq 20dB$$

Table 9.5: CPICH_Ec/Io Intra frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50

9.1.2.1.2 Relative accuracy requirement

The relative accuracy of CPICH Ec/Io is defined as the CPICH Ec/Io measured from one cell compared to the CPICH Ec/Io measured from another cell on the same frequency.

The accuracy requirements in table 9.6 are valid under the following conditions:

CPICH_RSCP1,2$|_{dBm}$ ≥ -114 dBm.

$$\left| CPICH\_RSCP1|_{in\ dBm} - CPICH\_RSCP2|_{in\ dBm} \right| \leq 20dB$$

$$\left| \frac{I_o}{\left(\hat{I}_{or}\right)} \right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}} \right)_{in\ dB} \leq 20dB$$

Table 9.6: CPICH_Ec/Io Intra frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50

9.1.2.2 Inter frequency measurement accuracy

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.3. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.3.

9.1.2.2.1 Absolute accuracy requirement

The accuracy requirements in table 9.7 are valid under the following conditions:

CPICH_RSCP1$|_{dBm}$ ≥ -114 dBm.

$$\left.\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}}\right)_{in\ dB} \leq 20dB$$

Table 9.7: CPICH_Ec/Io Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50

9.1.2.2.2 Relative accuracy requirement

The relative accuracy of CPICH Ec/Io in the inter frequency case is defined as the CPICH Ec/Io measured from one cell compared to the CPICH Ec/Io measured from another cell on a different frequency

The accuracy requirements in table 9.8 are valid under the following conditions:

CPICH_RSCP1,2$|_{dBm}$ ≥ -114 dBm.

$$\left|CPICH\_RSCP1|_{in\ dBm} - CPICH\_RSCP2|_{in\ dBm}\right| \leq 20dB$$

| Channel 1_Io$|_{dBm}$ -Channel 2_Io$|_{dBm}$| ≤ 20 dB.

$$\left.\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left(\frac{CPICH\_E_c}{I_{or}}\right)_{in\ dB} \leq 20dB$$

Table 9.8: CPICH_Ec/Io Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-94...-50

9.1.2.3 CPICH Ec/Io measurement report mapping

The reporting range is for *CPICH Ec/Io* is from -24 ...0 dB.

In table 9.9 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.9

Reported value	Measured quantity value	Unit
CPICH_Ec/No _00	CPICH Ec/Io < -24	dB
CPICH_Ec/No _01	-24 ≤ CPICH Ec/Io < -23.5	dB
CPICH_Ec/No _02	-23.5 ≤ CPICH Ec/Io < -23	dB
…	…	…
CPICH_Ec/No _47	-1 ≤ CPICH Ec/Io < -0.5	dB
CPICH_Ec/No _48	-0.5 ≤ CPICH Ec/Io < 0	dB
CPICH_Ec/No _49	0 ≤ CPICH Ec/Io	dB

9.1.3 UTRA Carrier RSSI

NOTE: This measurement is for Inter-frequency handover evaluation.

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.2 for intra frequency measurements and in sub clause 8.1.2.2 for inter frequency measurements. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.2 for intra frequency measurements and in sub clause 8.4.2.3 for inter frequency measurements.

9.1.3.1 Absolute accuracy requirement

Table 9.10: UTRA Carrier RSSI~~Io~~ Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
Io	dBm	± 4	± 7	-94...-70
	dBm	± 6	± 9	-70~~94~~...-50

9.1.3.2 Relative accuracy requirement

The relative accuracy requirement is defined as the UTRAN RSSI measured from one frequency compared to the UTRAN RSSI measured from another frequency.

The accuracy requirements in table 9.11 are valid under the following condition:

$| \text{Channel 1\_Io}|_{\text{dBm}} - \text{Channel 2\_Io}|_{\text{dBm}} | < 20$ dB.

Table 9.11: UTRA Carrier RSSI~~Io~~ Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
UTRA Carrier RSSI~~Io~~	dBm	± 7	± 11	-94...-70

9.1.3.3 UTRA Carrier RSSI measurement report mapping

The reporting range for *UTRA carrier RSSI* is from -100 ...-25 dBm.

In table 9.12 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.12

Reported value	Measured quantity value	Unit
UTRA_carrier_RSSI_LEV _00	UTRA carrier RSSI < -100	dBm
UTRA_carrier_RSSI_LEV _01	-100 ≤ UTRA carrier RSSI < -99	dBm
UTRA_carrier_RSSI_LEV _02	-99 ≤ UTRA carrier RSSI < -98	dBm
…	…	…
UTRA_carrier_RSSI_LEV _74	-27 ≤ UTRA carrier RSSI < -26	dBm
UTRA_carrier_RSSI_LEV _75	-26 ≤ UTRA carrier RSSI < -25	dBm
UTRA_carrier_RSSI_LEV _76	-25 ≤ UTRA carrier RSSI	dBm

9.1.11 P-CCPCH RSCP

NOTE: This measurement is used for handover between UTRA FDD and UTRA TDD.

The requirements in this section are valid for terminals supporting this capability.

The measurement period for CELL_DCH state can be found in sub clause 8.1.2.4. The measurement period for CELL_FACH state can be found in sub clause 8.4.2.4.

9.1.11.1 Absolute accuracy requirements

The accuracy requirement in table 9.31is valid under the following conditions:

P-CCPCH_RSCP ≥ -102 dBm.

$$\left|\frac{I_o}{\left(\hat{I}_{or}\right)}\right|_{in\ dB} - \left|\left(\frac{P-CCPCH\_E_c}{I_{or}}\right)\right|_{in\ dB} \leq 8dB$$

Table 9.31: P-CCPCH_RSCP Inter frequency absolute accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal conditions	Extreme conditions	Io [dBm]
P-CCPCH_RSCP	dBm	± 6	± 9	-94...-70
	dBm	± 8	± 11	-7094...-50

9.1.11.2 P-CCPCH RSCP measurement report mapping

The reporting range is for *P-CCPCH RSCP* is from -115 ... -25 dBm.

In table 9.32 the mapping of measured quantity is defined. The range in the signalling may be larger than the guaranteed accuracy range.

Table 9.32

Reported value	Measured quantity value	Unit
PCCPCH_RSCP_LEV _00	PCCPCH RSCP< -115	DBm
PCCPCH_RSCP_LEV _01	-115 ≤ PCCPCH RSCP< -114	DBm
PCCPCH_RSCP_LEV _02	-114 ≤ PCCPCH RSCP< -113	DBm
PCCPCH_RSCP_LEV _03	-113 ≤ PCCPCH RSCP< -112	DBm
…	…	…
PCCPCH_RSCP_LEV _89	-27 ≤ PCCPCH RSCP< -26	DBm
PCCPCH_RSCP_LEV _90	-26 ≤ PCCPCH RSCP< -25	DBm
PCCPCH_RSCP_LEV _91	-25 ≤ PCCPCH RSCP	DBm

A.9 Measurement Performance Requirements

Unless explicitly stated:

- Reported measurements shall be within defined range in 90 % of the cases.
- Measurement channel is 12.2 kbps as defined in TS 25.101 annex A, sub-clause A.3.1. This measurement channel is used both in active cell and cells to be measured.
- Physical channels used as defined in TS 25.101 annex C.
- Cell 1 is the active cell.
- Single task reporting.
- Power control is active.

A.9.1 Measurement Performance for UE

A.9.1.1 CPICH RSCP

A.9.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH RSCP measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.1.

A.9.1.1.1.1 Intra frequency test parameters

In this case all cells are on the same frequency. ~~Table A.9.1 defines the limits of signal strengths and code powers, when the requirements are applicable.~~ Both CPICH RSCP intra frequency absolute and relative accuracy requirements are tested by using test parameters in Table A.9.1.

~~When verifying the CPICH RSCP intra frequency absolute accuracy requirement only cell 1 in table A.9.1 shall be present. When verifying the CPICH RSCP intra frequency relative accuracy requirement both cell 1 and 2 in table A.9.1 shall be present.~~

Table A.9.1: CPICH RSCP Intra frequency test parameters

~~Parameter~~	~~Unit~~	~~Cell 1~~	~~Cell 2~~
~~UTRA RF Channel number~~		~~Channel 1~~	~~Channel 1~~
~~CPICH_Ec/Ior~~	~~dB~~	~~-10~~	~~-10~~
~~PCCPCH_Ec/Ior~~	~~dB~~	~~-12~~	~~-12~~
~~SCH_Ec/Ior~~	~~dB~~	~~-12~~	~~-12~~
~~PICH_Ec/Ior~~	~~dB~~	~~-15~~	~~-15~~
~~DPCH_Ec/Ior~~	~~dB~~	~~-15~~	~~-15~~
~~OCNS~~	~~dB~~	~~-1.11~~	~~-1.11~~
~~Îor/Ioc~~	~~dB~~	~~10.5~~	~~10.5~~
~~Ioc~~	~~dBm/ 3.84 MHz~~	~~*Io -13.7 dB = Ioc*, Note 1~~	~~*Io -13.7 dB = Ioc*, Note 1~~
~~Range 1:Io~~ ~~Range 2: Io~~	~~dBm~~	~~-94…-70~~ ~~-94… 50~~	~~-94…-70~~ ~~-94… 50~~
~~Propagation condition~~	~~-~~	~~AWGN~~	
~~NOTE 1: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.~~			

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1		Channel 1		Channel 1	
CPICH_Ec/Ior	dB	-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15	
DPCH_Ec/Ior	dB	-15	-	-15	-	-15	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-1.11	-0.94	-1.11	-0.94
Ioc	dBm/ 3.84 MHz	-75.54		-59.98		-97.52	
Îor/Ioc	dB	4	0	9	0	0	-6.53
CPICH RSCP, Note 1	dBm	-81.5	-85.5	-60.98	-69.88	-107.5	-114.0
Io, Note 1	dBm	-69		-50		-94	
Propagation condition	-	AWGN		AWGN		AWGN	
NOTE 1: CPICH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.							

A.9.1.1.1.2 Inter frequency test parameters

In this case both cells are on different frequencies and compressed mode is applied. The gap length is 7, detailed definition is in TS 25.101 annex A.5, Set 1 of Table A.22 [14 slots is FSS]. ~~Table A.9.2 defines the limits of signal strengths and code powers, where the requirement is applicable.~~ CPICH RSCP inter frequency relative accuracy requirements are tested by using test parameters in Table A.9.2.

~~When verifying the CPICH RSCP inter frequency relative accuracy requirement both cell 1 and 2 in table A.9.2 shall be present.~~

Table A.9.2: CPICH RSCP Inter frequency tests parameters

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
Îor/Ioc	dB	10.1	10.1
Ioc	dBm/ 3.84 MHz	*Io -10.6 dB = Ioc*, Note 1	*Io -10.6 dB = Ioc*, Note 1
Range 1:Io Range 2: Io	dBm	-94…-70 -94…-50	-94…-70 -94…-50
Propagation condition	-	AWGN	
NOTE 1: *Ioc* level shall be adjusted in each carrier frequency according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.			

Parameter	Unit	Test 1		Test 2	
		Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2	Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12	
SCH_Ec/Ior	dB	-12		-12	
PICH_Ec/Ior	dB	-15		-15	
DPCH_Ec/Ior	dB	-15	-	-15	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-1.11	-0.94
Ioc	dBm/ 3.84 MHz	-60.00	-60.00	-84.00	-94.46
Îor/Ioc	dB	9.54	9.54	0	-9.54
CPICH RSCP, Note 1	dBm	-60.46	-60.46	-94.0	-114.0
Io, Note 1	dBm	-50.00	-50.00	-81.0	-94.0
Propagation condition	-	AWGN		AWGN	
NOTE 1: CPICH RSCP and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.					
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for test 2 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.					

A.9.1.1.2 Test Requirements

The CPICH RSCP measurement accuracy shall meet the requirements in section 9.1.1.

A.9.1.2 CPICH Ec/Io

A.9.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the CPICH Ec/Io measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.2.

A.9.1.2.1.1 Intra frequency test parameters

In this case all cells are in the same frequency. ~~Table A.9.3 defines the limits of signal strengths and code powers, where the requirements are applicable.~~ Both CPICH Ec/Io absolute and relative accuracy requirements are tested by using test parameters in Table A.9.3

~~When verifying the CPICH Ec/Io intra frequency absolute accuracy requirement only cell 1 in table A.9.3 shall be present. When verifying the CPICH Ec/Io intra frequency relative accuracy requirement both cell 1 and 2 in table A.9.3 shall be present.~~

Table A.9.3: CPICH Ec/Io Intra frequency test parameters

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 1
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
Îor/Ioc	dB	10.5	10.5
Ioc	dBm/ 3.84 MHz	*Io -13.7 dB = Ioc*, Note 1	*Io -13.7 dB = Ioc*, Note 1
Range 1:Io Range 2: Io	dBm	-94…-70 -94…-50	-94…-70 -94…-50
Propagation condition	-	AWGN	
NOTE 1: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.			

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1		Channel 1		Channel 1	
CPICH_Ec/Ior	dB	-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15	
DPCH_Ec/Ior	dB	-15	-	-15	-	-6	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-1.11	-0.94	.2.56	-0.94
Ioc	dBm/ 3.84 MHz	-56.98		-89.07		-94.98	
Îor/Ioc	dB	3.0	3.0	-2.9	-2.9	-9.0	-9.0
CPICH Ec/Io, Note 1	dBm	-14.0	-14.0	-16.0	-16.0	-20.0	-20.0
Io, Note 1	dBm	-50		-86		-94	
Propagation condition	-	AWGN		AWGN		AWGN	
NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.							

A.9.1.2.1.2 Inter frequency test parameters

In this case both cells are in different frequency and compressed mode is applied. The gap length is 7, detailed definition is in TS 25.101 annex A.5, Set 1 of Table A.22 [14 slots is FSS]. Table A.9.4 defines the limits of signal strengths and code powers, where the requirement is applicable. CPICH Ec/Io inter frequency relative accuracy requirements are tested by using test parameters in Table A.9.4.

When verifying the CPICH Ec/Io inter frequency relative accuracy requirement both cell 1 and 2 in table A.9.4 shall be present.

Table A.9.4: CPICH Ec/Io Inter frequency tests parameters

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10	-10
PCCPCH_Ec/Ior	dB	-12	-12
SCH_Ec/Ior	dB	-12	-12
PICH_Ec/Ior	dB	-15	-15
DPCH_Ec/Ior	dB	-15	-15
OCNS	dB	-1.11	-1.11
Îor/Ioc	dB	10.1	10.1
Ioc	dBm/ 3.84 MHz	*Io -10.6 dB = Ioc*, Note 1	*Io -10.6 dB = Ioc*, Note 1
Range 1:Io Range 2: Io	dBm	-94…-70 -94…50	-94…-70 -94…50
Propagation condition	-	AWGN	
NOTE 1: *Ioc* level shall be adjusted in each carrier frequency according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.			

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2	Channel 1	Channel 2	Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15	
DPCH_Ec/Ior	dB	-15	-	-6	-	-6	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-2.56	-0.94	-2.56	-0.94
Ioc	dBm/ 3.84 MHz	-52.22	-52.22	-87.27	-87.27	-94.46	-94.46
Îor/Ioc	dB	-1.75	-1.75	-4.7	-4.7	-9.54	-9.54
CPICH Ec/Io, Note 1	dBm	-14.0	-14.0	-16.0	-16.0	-20.0	-20.0
Io, Note 1	dBm	-50	-50	-86	-86	-94	-94
Propagation condition	-	AWGN		AWGN		AWGN	
NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.							

A.9.1.2.2 Test Requirements

The CPICH Ec/Io measurement accuracy shall meet the requirements in section 9.1.2. In case of the absolute CPICH_Ec/Io measurement accuracy and relative inter-frequency CPICH_Ec/Io measurement accuracy test cases the effect of assumed thermal noise and noise generated in the receiver (–99 dBm) shall be added into the required accuracy defined in Section 9.1.2 as shown in Table A.9.4A.

Table A.9.4A: CPICH_Ec/Io Intra and Inter frequency absolute accuracy and CPICH_Ec/Io Inter frequency relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
CPICH_Ec/Io	dB	-2.7…1.5 for -14 ≤ CPICH Ec/Io –3.2…2 for -16 ≤ CPICH Ec/Io < -14 –4.2…3 for -20 ≤ CPICH Ec/Io < -16	-4.2…3	-94...-87
		± 1.5 for -14 ≤ CPICH Ec/Io ± 2 for -16 ≤ CPICH Ec/Io < -14 ± 3 for -20 ≤ CPICH Ec/Io < -16	± 3	-87...-50

A.9.1.3 UTRA Carrier RSSI

A.9.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UTRA Carrier RSSI measurement accuracy is within the specified limits. This test will verify the requirements in section 9.1.3. UTRA Carrier RSSI accuracy requirements are tested by using test parameters in Table A.9.5.

~~Table A.9.5 defines the limits of signal strengths, where the requirement is applicable.~~

~~When verifying the UTRA Carrier RSSI absolute accuracy requirement only cell 1 in table A.9.5 shall be present. When verifying the UTRA Carrier RSSI relative accuracy requirement both cell 1 and 2 in table A.9.5 shall be present.~~

Table A.9.5: UTRA Carrier RSSI Inter frequency test parameters

Parameter	Unit	Cell 1	Cell 2
UTRA RF Channel number	-	Channel 1	Channel 2
Îor/Ioc	dB	-1	-1
Ioc	dBm/ 3.84 MHz	*Io -4.13 dB = Ioc,* Note 1	*Io -4.13 dB = Ioc,* Note 1
Range 1: Io Range 2: Io	dBm/ 3.84 MHz	-94…-70 -94…-50	-94…-70 -94…-50
Propagation condition	-	AWGN	
NOTE 1: *Ioc* level shall be adjusted according the total signal power *Io* at receiver input and the geometry factor *Îor/Ioc*.			

Parameter	Unit	Test 1		Test 2		Test 3	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
UTRA RF Channel number		Channel 1	Channel 2	Channel 1	Channel 2	Channel 1	Channel 2
CPICH_Ec/Ior	dB	-10		-10		-10	
PCCPCH_Ec/Ior	dB	-12		-12		-12	
SCH_Ec/Ior	dB	-12		-12		-12	
PICH_Ec/Ior	dB	-15		-15		-15	
DPCH_Ec/Ior	dB	-15	-	-6	-	-6	-
OCNS_Ec/Ior	dB	-1.11	-0.94	-2.56	-0.94	-2.56	-0.94
Ioc	dBm/ 3.84 MHz	-52.22	-52.22	-70.27	-70.27	-94.46	-94.46
Îor/Ioc	dB	-1.75	-1.75	-4.7	-4.7	-9.54	-9.54
CPICH Ec/Io, Note 1	dBm	-14.0	-14.0	-16.0	-16.0	-20.0	-20.0
Io, Note 1	dBm	-50	-50	-69	-69	-94	-94
Propagation condition	-	AWGN		AWGN		AWGN	
NOTE 1: CPICH Ec/Io and Io levels have been calculated from other parameters for information purposes. They are not settable parameters themselves.							
Tests shall be done sequentially. Test 1 shall be done first. After test 1 has been executed test parameters for tests 2 and 3 shall be set within 5 seconds so that UE does not loose the Cell 2 in between the tests.							

A.9.1.3.2 Test Requirements

The UTRA Carrier RSSI measurement accuracy shall meet the requirements in section 9.1.3. The effect of assumed thermal noise and noise generated in the receiver (–99 dBm) shall be added into the required accuracy defined in Section 9.1.2 as shown in Table A.9.5A.

Table A.9.5A: UTRA Carrier RSSI absolute and relative accuracy

Parameter	Unit	Accuracy [dB]		Conditions
		Normal condition	Extreme condition	Io [dBm]
UTRA Carrier RSSI	dBm	-4…5.2	-7…8.2	-94…-87
	dBm	± 4	± 7	-87…-70
	dBm	± 6	± 9	-70…-50

3GPP TSG RAN WG4 Meeting #20 **R4-011640**

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CR-Form-v4

CHANGE REQUEST

⌘ **25.133** **CR** **217** ⌘ ev ⌘ Current version: **3.7.0** ⌘

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

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

Title:	⌘	Clarifications on requirements for reporting criteria per measurement category
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 2001-11-15
Category:	⌘	**F** ***Release:*** ⌘ Rel99

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)

Reason for change:	⌘	The number of allowed parallel events might be interpreted wrongly.
Summary of change:	⌘	It is clarified that the same events are counted as different events if either any of their paramenters related to the event or their neighbour cell lists differ from each other. Isolated Impact Analysis: Clarification to a function where the specification was not sufficiently explicit. The clarification would not affect implementations behaving like indicated in the CR but it would affect implementations supporting the corrected functionality. The corrected functionality is the support of the number of event triggering and reporting criteria in the UE. If the network does not implement this change, the UE might not be able to track all events requested by the network.
Consequences if not approved:	⌘	Network might request too many parallel events to be tracked by UE, which would cause interoperation problems between the UE and the network.

Clauses affected:	⌘	8.3.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ 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.

8.2 Measurements in CELL_DCH State with special requirements

8.2.1 Introduction

This section contains specific requirements for certain measurements beyond those specified in section 8.1. The measurements are defined in TS 25.215, the measurement model is defined in TS 25.302 and measurement accuracies are specified in section 9. Control of measurement reporting is specified in TS 25.331. Compressed mode is specified in TS 25.215.

8.2.2 Requirements

The requirements in section 9 are applicable for a UE performing measurements according to this section.

The UE shall be able to perform measurements according to table 8.9.

In addition to the requirements in table 8.9 the UE shall in parallel, in state CELL_DCH, also be able to measure and report the quantities according to section 8.1.

Table 8.9: Parallel measurement requirements

Measurement quantity	Number of parallel measurements possible to request from the UE
Transport channel BLER	1 per Transport Channel
UE transmitted power	1
UE Rx-Tx time difference	1 including timing to all radio links in active set
SFN-SFN observed time difference type 2	[]
UE GPS Timing of Cell Frames for LCS	[]

Editors Note: The presence of the measurements for location services needs to be revised.

8.3 Capabilities for Support of Event Triggering and Reporting Criteria in CELL_DCH state

8.3.1 Introduction

This section contains requirements on UE capabilities for support of event triggering and reporting criteria.

The UE can be requested to make measurements under different measurement identity numbers. With each identity number there may be associated multiple number of events. The purpose of this section is to set some limits on the number of different reporting criteria the UE may be requested to track in parallel.

8.3.2 Requirements

In this section reporting criteria can be either event triggered reporting criteria or periodic reporting criteria.

The UE shall be able to support in parallel per category up to E_{cat} reporting criteria according to Table 8.10. The same type of events (e.g. events 1A) are counted as different events if either any of the parameters related to the events or their neighbour cell lists differ from each other. For the measurement categories: Intra-frequency, Inter frequency, Inter frequency (virtual active set), and Inter-RAT the UE need not support more than 18 reporting criteria in total. For the measurement categories Traffic volume and Quality measurements the UE need not support more than 16 reporting criteria in total.

Table 8.10: Requirements for reporting criteria per measurement category

Measurement category	E_{cat}	Note
Intra-frequency	8	Applicable for periodic reporting or FDD events (1A-1F).
Inter-frequency	6	Applicable for periodic reporting or Event 2A-2F
Inter-frequency, virtual active set	4	Applicable for periodic reporting or Event 1A-1C
Inter-RAT	4	Only applicable for UE with this capability
UE internal measurements	8	
Traffic volume measurements	2 + (2 per Transport Channel)	
Quality measurements	2 per Transport Channel	
UP measurements	2	Only applicable for UE with this capability.

3GPP TSG RAN WG4 Meeting #20 **R4-011641**

East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133** **CR** **218** ⌘ ev ⌘ Current version: **4.2.0** ⌘

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

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

Title:	⌘	Clarifications on requirements for reporting criteria per measurement category
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 2001-11-15
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)

Reason for change:	⌘	The number of allowed parallel events might be interpreted wrongly.
Summary of change:	⌘	It is clarified that the same events are counted as different events if either any of their paramenters related to the event or their neighbour cell lists differ from each other. Isolated Impact Analysis: Clarification to a function where the specification was not sufficiently explicit. The clarification would not affect implementations behaving like indicated in the CR but it would affect implementations supporting the corrected functionality. The corrected functionality is the support of the number of event triggering and reporting criteria in the UE. If the network does not implement this change, the UE might not be able to track all events requested by the network.
Consequences if not approved:	⌘	Network might request too many parallel events to be tracked by UE, which would cause interoperation problems between the UE and the network.

Clauses affected:	⌘	8.3.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ 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.

8.2 Measurements in CELL_DCH State with special requirements

8.2.1 Introduction

This section contains specific requirements for certain measurements beyond those specified in section 8.1. The measurements are defined in TS 25.215, the measurement model is defined in TS 25.302 and measurement accuracies are specified in section 9. Control of measurement reporting is specified in TS 25.331. Compressed mode is specified in TS 25.215.

8.2.2 Requirements

The requirements in section 9 are applicable for a UE performing measurements according to this section.

The UE shall be able to perform measurements according to table 8.9.

In addition to the requirements in table 8.9 the UE shall in parallel, in state CELL_DCH, also be able to measure and report the quantities according to section 8.1.

Table 8.9: Parallel measurement requirements

Measurement quantity	Number of parallel measurements possible to request from the UE
Transport channel BLER	1 per Transport Channel
UE transmitted power	1
UE Rx-Tx time difference	1 including timing to all radio links in active set
SFN-SFN observed time difference type 2	[]
UE GPS Timing of Cell Frames for LCS	[]

Editors Note: The presence of the measurements for location services needs to be revised.

8.3 Capabilities for Support of Event Triggering and Reporting Criteria in CELL_DCH state

8.3.1 Introduction

This section contains requirements on UE capabilities for support of event triggering and reporting criteria.

The UE can be requested to make measurements under different measurement identity numbers. With each identity number there may be associated multiple number of events. The purpose of this section is to set some limits on the number of different reporting criteria the UE may be requested to track in parallel.

8.3.2 Requirements

In this section reporting criteria can be either event triggered reporting criteria or periodic reporting criteria.

The UE shall be able to support in parallel per category up to E_{cat} reporting criteria according to Table 8.10. The same type of events (e.g. events 1A) are counted as different events if either any of the parameters related to the events or their neighbour cell lists differ from each other. For the measurement categories: Intra-frequency, Inter frequency, Inter frequency (virtual active set), and Inter-RAT the UE need not support more than 18 reporting criteria in total. For the measurement categories Traffic volume and Quality measurements the UE need not support more than 16 reporting criteria in total.

Table 8.10: Requirements for reporting criteria per measurement category

Measurement category	E_{cat}	Note
Intra-frequency	8	Applicable for periodic reporting or FDD events (1A-1F).
Inter-frequency	6	Applicable for periodic reporting or Event 2A-2F
Inter-frequency, virtual active set	4	Applicable for periodic reporting or Event 1A-1C
Inter-RAT	4	Only applicable for UE with this capability
UE internal measurements	8	
Traffic volume measurements	2 + (2 per Transport Channel)	
Quality measurements	2 per Transport Channel	
UP measurements	2	Only applicable for UE with this capability.

3GPP TSG RAN WG4 Meeting #20 **R4-011642**

East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133** **CR** **219** ⌘ ev ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	Clarifications on requirements for reporting criteria per measurement category
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 2001-11-15
Category:	⌘	**A** ***Release:*** ⌘ Rel-5

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

Use one of the following releases:

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

Reason for change:	⌘	The number of allowed parallel events might be interpreted wrongly.
Summary of change:	⌘	It is clarified that the same events are counted as different events if either any of their paramenters related to the event or their neighbour cell lists differ from each other. Isolated Impact Analysis: Clarification to a function where the specification was not sufficiently explicit. The clarification would not affect implementations behaving like indicated in the CR but it would affect implementations supporting the corrected functionality. The corrected functionality is the support of the number of event triggering and reporting criteria in the UE. If the network does not implement this change, the UE might not be able to track all events requested by the network.
Consequences if not approved:	⌘	Network might request too many parallel events to be tracked by UE, which would cause interoperation problems between the UE and the network.

Clauses affected:	⌘	8.3.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ 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.

8.2 Measurements in CELL_DCH State with special requirements

8.2.1 Introduction

This section contains specific requirements for certain measurements beyond those specified in section 8.1. The measurements are defined in TS 25.215, the measurement model is defined in TS 25.302 and measurement accuracies are specified in section 9. Control of measurement reporting is specified in TS 25.331. Compressed mode is specified in TS 25.215.

8.2.2 Requirements

The requirements in section 9 are applicable for a UE performing measurements according to this section.

The UE shall be able to perform measurements according to table 8.9.

In addition to the requirements in table 8.9 the UE shall in parallel, in state CELL_DCH, also be able to measure and report the quantities according to section 8.1.

Table 8.9: Parallel measurement requirements

Measurement quantity	Number of parallel measurements possible to request from the UE
Transport channel BLER	1 per Transport Channel
UE transmitted power	1
UE Rx-Tx time difference	1 including timing to all radio links in active set
SFN-SFN observed time difference type 2	[]
UE GPS Timing of Cell Frames for LCS	[]

Editors Note: The presence of the measurements for location services needs to be revised.

8.3 Capabilities for Support of Event Triggering and Reporting Criteria in CELL_DCH state

8.3.1 Introduction

This section contains requirements on UE capabilities for support of event triggering and reporting criteria.

The UE can be requested to make measurements under different measurement identity numbers. With each identity number there may be associated multiple number of events. The purpose of this section is to set some limits on the number of different reporting criteria the UE may be requested to track in parallel.

8.3.2 Requirements

In this section reporting criteria can be either event triggered reporting criteria or periodic reporting criteria.

The UE shall be able to support in parallel per category up to E_{cat} reporting criteria according to Table 8.10. The same type of events (e.g. events 1A) are counted as different events if either any of the parameters related to the events or their neighbour cell lists differ from each other. For the measurement categories: Intra-frequency, Inter frequency, Inter frequency (virtual active set), and Inter-RAT the UE need not support more than 18 reporting criteria in total. For the measurement categories Traffic volume and Quality measurements the UE need not support more than 16 reporting criteria in total.

Table 8.10: Requirements for reporting criteria per measurement category

Measurement category	E_{cat}	Note
Intra-frequency	8	Applicable for periodic reporting or FDD events (1A-1F).
Inter-frequency	6	Applicable for periodic reporting or Event 2A-2F
Inter-frequency, virtual active set	4	Applicable for periodic reporting or Event 1A-1C
Inter-RAT	4	Only applicable for UE with this capability
UE internal measurements	8	
Traffic volume measurements	2 + (2 per Transport Channel)	
Quality measurements	2 per Transport Channel	
UP measurements	2	Only applicable for UE with this capability.

3GPP TSG RAN WG4 Meeting #20 **R4-011643**
East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133 CR 220** ⌘ ev **-** ⌘ Current version: **3.7.0** ⌘

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

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

Title:	⌘	Inconsistent use of “sets of cells” with respect to definition of RRC specs.
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 2001-11-15
Category:	⌘	**F** ***Release:*** ⌘ Rel99

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

Reason for change: ⌘ The term “detected” used in TS25.133 is not in accordance with definition of sets of cells given in TS25.331, section 8.4 (RRC specification). Clarification of “detectable” cell.

Summary of change: ⌘
1. Clarify the word ”detectable”.
2. Align use of the word “detected” with definitions of 25.331 : “detected” is used only for “detected set” and replaced by ”identified” otherwise.
3. Align use of “set of cells” with TS 25.331.
4. The sentence “ *The detectable cells, in the monitored set, that were not measured during that measurement period, shall be measured in the following measurement periods*” is removed and clarified by the following sentence in stead "*If the UE has identified more than Ymeasurement intra cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased."*

Isolated Impact Analysis: Correction to a function where the specification was containing some contradictions. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Consequences if not approved: ⌘ Inconsistencies between 25.133 and 25.331. Misinterpretation of “detectable” cell.

Clauses affected: ⌘ 4.2.2.2;4.2.2.3;8.1.2.2;8.1.2.2.1;8.1.2.2.2;8.1.2.2.5;8.1.2.3;8.1.2.3.1;8.1.2.3.4;8.1.2.3.4;8.1.2.4.1;8.4.2.2;8.4.2.2.1;8.4.2.2.2;8.4.2.3;8.4.2.3.1

Other specs affected: ⌘ ☐ Other core specifications ⌘
☐ Test specifications

	☐ O&M Specifications	
Other comments:	⌘	

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4.2.2.2 Measurements of intra-frequency cells

The UE shall measure CPICH Ec/Io and CPICH RSCP at least every $T_{measureFDD}$ (see table 4.1) for intra-frequency cells that are ~~detected~~ identified and measured according to the measurement rules. $T_{measureFDD}$ is defined in Table 4.1. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured intra-frequency cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureFDD}/2$.
The filtering shall be such that the UE shall be capable of evaluating that an intra-frequency cell has become better ranked than the serving cell within $T_{evaluateFDD}$ (see table 4.1), from the moment the intra-frequency cell became at least 3 dB better ranked than the current serving cell, provided that Treselection timer is set to zero and either CPICH Ec/Io or CPICH RSCP is used as measurement quantity for cell reselection.
If Treselection timer has a non zero value and the intra-frequency cell is better ranked than the serving cell, the UE shall evaluate this intra-frequency cell for the Treselection time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

4.2.2.3 Measurements of inter-frequency FDD cells

The UE shall measure CPICH Ec/Io and CPICH RSCP at least every $(N_{carrier}-1) * T_{measureFDD}$ (see table 4.1) for inter-frequency cells that are ~~detected~~ identified and measured according to the measurement rules. The parameter $N_{carrier}$ is the number of carriers used for FDD cells. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured inter-frequency cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureFDD}/2$.
If CPICH Ec/Io is used as measurement quantity for cell reselection, the filtering shall be such that the UE shall be capable of evaluating that an already ~~detected~~ identified inter-frequency cell has become better ranked than the serving cell within $(N_{carrier}-1) * T_{evaluateFDD}$ (see table 4.1) from the moment the inter-frequency cell became at least 3 dB better than the current serving cell provided that Treselection timer is set to zero. For non-~~detected~~ identified inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell has become better ranked than the serving cell within 30 s from the moment the inter-frequency cell became at least 3 dB better ranked than the current serving cell provided that Treselection timer is set to zero.
If CPICH RSCP is used as measurement quantity for cell reselection, the filtering shall be such that the UE shall be capable of evaluating that an already ~~detected~~ identified inter-frequency cell has become better ranked than the serving cell within $(N_{carrier}-1) * T_{evaluateFDD}$ from the moment the inter-frequency cell became at least 5 dB better than the current serving cell provided that Treselection timer is set to zero. For non-~~detected~~ identified inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell has become better ranked than the serving cell within 30 s from the moment the inter-frequency cell became at least 5 dB better ranked than the current serving cell provided that Treselection timer is set to zero.
If Treselection timer has a non zero value and the inter-frequency cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the Treselection time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

8.1.2.2 FDD intra frequency measurements

During the CELL_DCH state the UE shall continuously measure ~~detected~~ identified intra frequency cells and search for new intra frequency cells in the monitoring set. In case the network requests the UE to report ~~unlisted~~ detected set cells, the UE shall also search for intra frequency cells outside the monitored and active set. Cells, which are neither included in the active set nor in the monitored set, and are ~~detected~~ identified by the UE belong to the detected set according to TS 25.331. If compressed mode pattern sequences are activated, intra frequency measurements can be performed between the transmission gaps simultaneously for data reception from the active set cell/s.

8.1.2.2.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{identify\ \ intra} = Max\left\{800, T_{basic\ identify\ FDD,\ intra} \cdot \frac{T_{Measurement\ Period,\ Intra}}{T_{Intra}}\right\} ms$$

A cell shall be considered detectable when CPICH Ec/Io $\geq$ -20 dB, SCH_Ec/Io $\geq$ -20 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

8.1.2.2.2 UE CPICH measurement capability

In the CELL_DCH state the measurement period for intra frequency measurements is 200 ms. When no transmission gap pattern sequence is activated, the UE shall be capable of performing CPICH measurements for 8 ~~detected~~identified ~~-~~intra-frequency cells~~, in~~ of the monitored set and/or the active set, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When one or more transmission gap pattern sequences are activated, the UE shall be capable of performing CPICH measurements for at least $Y_{measurement\ intra}$ cells , where $Y_{measurement\ intra}$ is defined in the following equation. ~~The detectable cells, in the monitored set, that were not measured during that measurement period, shall be measured in the following measurement periods.~~ The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.1 and 9.1.2. If the UE has identified more than $Y_{measurement\ intra}$ cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{measurement\ intra} = Floor\left\{ X_{basic\ measurement\ FDD} \cdot \frac{T_{Intra}}{T_{Measurement\ Period,\ Intra}} \right\} \text{ cells}$$

where

$X_{basic\ measurement\ FDD}$ = 8 (cells)

$T_{Measurement\_Period\ Intra}$ = 200 ms. The measurement period for Intra frequency CPICH measurements.

T_{Intra} : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing.

$T_{basic\_identify\_FDD,\ intra}$ = 800 ms. This is the time period used in the intra frequency equation where the maximum allowed time for the UE to identify a new FDD cell is defined.

8.1.2.2.5 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH . The delay uncertainty is twice the TTI of the uplink DCCH.

Editors Note: The test cases in section A.8 will need revisions to reflect the general requirements.

The event triggered measurement reporting delay, on cells belonging to monitored set, measured without L3 filtering, shall be less than the above defined $T_{identify\ intra}$. defined in Section 8.1.2.2.1

If a cell, belonging to monitored set, which the UE has ~~detected~~ identified and measured at least once over the measurement period, becomes undetectable for a period < 5 seconds and then the cell becomes detectable again and triggers an event, the measurement reporting delay shall be less than $T_{Measurement\_Period\ Intra}$ ms provided the timing to that cell has not changed more than +/-32 chips, the UE CPICH measurement capabilities of section 8.1.2.2.2 are valid and L3 filtering has not been used. When L3 filtering is used an additional delay can be expected.

If a cell belonging to monitored set has been detectable at least for the time period $T_{identify\_intra}$ and then enters the reporting range, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Intra}$ when the L3 filter has not been used and the UE CPICH measurement capabilities of Section 8.1.2.2.2 are valid.

8.1.2.3 FDD inter frequency measurements

In the CELL_DCH state when a transmission gap pattern sequence with the "FDD measurements" purpose is provided by the network the UE shall continuously measure ~~detected~~ identified inter frequency cells and search for new inter frequency cells indicated in the measurement control information.
In order for the requirements in the following subsections to apply the UTRAN must provide a transmission gap pattern sequence with measurement purpose FDD measurement using the following combinations for TGL1, TGL2 and TGD:

Table 8.1

TGL1 [slots]	TGL2 [slots]	TGD [slots]
7	-	undefined
14	-	undefined
10	-	undefined
7	7	15…269
14	14	15…269
10	5	15…269

8.1.2.3.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{\text{identify inter}} = Max\left\{5000, T_{\text{basic identify FDD,inter}} \cdot \frac{T_{\text{Measurement Period, Inter}}}{T_{\text{Inter}}} \cdot N_{Freq}\right\} ms$$

A cell shall be considered detectable when CPICH Ec/Io ≥ -20 dB, SCH_Ec/Io ≥ -17 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

8.1.2.3.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in section 9.
The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.
The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that ~~that~~ the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH . The delay uncertainty is twice the TTI of the uplink DCCH.
The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify inter}}$ defined in Section 8.1.2.3.1 When L3 filtering is used an additional delay can be expected.
If a cell has been detectable at least for the time period $T_{identify\_inter}$ and then enters the reporting range, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Inter}$ provided the timing to that cell has not changed more than +/-32 chips while transmission gap has not been available and the L3 filter has not been used.

8.1.2.4.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{\text{identify TDD inter}} = Max\left\{ 5000, T_{\text{basic identify TDD inter}} \cdot \frac{T_{\text{Measurement Period TDD inter}}}{T_{\text{TDD inter}}} \cdot N_{Freq} \right\} ms$$

A cell shall be considered detectable when P-CCPCH Ec/Io ≥ -8 dB, SCH_Ec/Io ≥ -13 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and the sum of all secondary synchronisation codes, where the secondary synchronisation codes are also equally divided. When L3 filtering is used an additional delay can be expected.

Where the received P-CCPCH E_c/I_o is defined as

$$\left(\frac{P-CCPCH\_E_c}{I_o} \right)_{in\ dB} = \left(\frac{P-CCPCH\_E_c}{I_{or}} \right)_{in\ dB} - \left(\frac{I_o}{\hat{I}_{or}} \right)_{in\ dB}$$

and the received SCH E_c/I_o is defined as

$$\left(\frac{SCH\_E_c}{I_o} \right)_{in\ dB} = \left(\frac{SCH\_E_c}{I_{or}} \right)_{in\ dB} - \left(\frac{I_o}{\hat{I}_{or}} \right)_{in\ dB}$$

8.4.2.2 FDD intra frequency measurements

During the CELL_FACH state the UE shall continuously measure ~~detected~~ identified intra frequency cells and search for new intra frequency cells in the monitoring set. If a measurement occasion is activated, intra frequency measurements can be performed between the measurement occasions.

8.4.2.2.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{identify,intra} = Max\left\{800, Ceil\left\{\frac{T_{basic\ identify\ FDD,intra}}{N_{TTI}\cdot(M\_REP-1)\cdot 10}\right\}\cdot N_{TTI}\cdot M\_REP\cdot 10\right\}\ ms$$

where

$T_{basic\_identify\_FDD,\ intra}$ is specified in section 8.1.2.2.2,

N_{TTI} and M_REP is specified in section 8.4.2.1.

A cell shall be considered detectable ~~and~~ when CPICH Ec/Io ≥ -20 dB, SCH_Ec/Io ≥ -20 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code.

8.4.2.2.2 UE CPICH measurement capability

In the CELL_FACH state the measurement period for intra frequency measurements is 200 ms. When no measurement occasion sequence is activated, the UE shall be capable of performing CPICH measurements for 8 ~~detected~~ identified intra-frequency cells of the monitored set and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When one measurement occasion sequence is activated, the UE shall be capable of performing CPICH measurements for the $Y_{\text{measurement intra}}$ strongest cells , where $Y_{\text{measurement intra}}$ is defined in the following equation. The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.1 and 9.1.2. If the UE has identified more than $Y_{\text{measurement intra}}$ cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{\text{measurement intra}} = Floor\left\{ X_{\text{basic measurement FDD}} \cdot \frac{T_{\text{Measurement\_Period Intra}} - Ceil\left\{ \frac{T_{\text{Measurement\_Period Intra}}}{N_{TTI} \cdot M\_REP \cdot 10\,\text{ms}} \right\} \cdot N_{TTI} \cdot 10\,\text{ms}}{T_{\text{Measurement\_Period Intra}}} \right\}$$

cells

where

$X_{\text{basic measurement FDD}}$ is specified in section 8.1.2.2.2,

$T_{\text{Measurement\_Period Intra}}$ is specified in section 8.1.2.2.2,

M_REP and N_{TTI} is specified in section 8.4.2.1.

8.4.2.3 FDD inter frequency measurements

In the CELL_FACH state when a measurement occasion cycle is provided by the network the UE shall continuously measure ~~detected~~ identified inter frequency cells and search for new inter frequency cells indicated in the measurement control information.

8.4.2.3.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{identify,\ inter} = Max\left\{5000, Ceil\left\{\frac{T_{basic\ identify\ FDD\ inter}}{T_{Inter\ FACH}}\right\} \cdot T_{meas} \cdot N_{Freq,FDD}\right\} \text{ ms}$$

where

$T_{basic\_identify\_FDD,inter}$ is specified in 8.1.2.3.2.

$N_{Freq,FDD}$: Number of FDD frequencies in the Inter-frequency cell info list

T_{Meas} and M_REP are specified in 8.4.2.1.

$T_{Inter\ FACH} = (N_{TTI}*10 - 2*0.5)$ ms

A cell shall be considered detectable ~~and~~ when CPICH Ec/Io $\geq$ -20 dB, SCH_Ec/Io $\geq$ -17 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code.

3GPP TSG RAN WG4 Meeting #20 **R4-011644**
East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133 CR 221** ⌘ ev **-** ⌘ Current version: **4.2.0** ⌘

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

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

Title:	⌘	Inconsistent use of “sets of cells” with respect to definition of RRC specs.
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 2001-11-15
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)

Reason for change: ⌘ The term “detected” used in TS25.133 is not in accordance with definition of sets of cells given in TS25.331, section 8.4 (RRC specification). Clarification of “detectable” cell.

Summary of change: ⌘
1. Clarify the word ”detectable”.
2. Align use of the word “detected” with definitions of 25.331 : “detected” is used only for “detected set” and replaced by ”identified” otherwise.
3. Align use of “set of cells” with TS 25.331.
4. The sentence “ *The detectable cells, in the monitored set, that were not measured during that measurement period, shall be measured in the following measurement periods*” is removed and clarified by the following sentence in stead "*If the UE has identified more than Ymeasurement intra cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased."*

Isolated Impact Analysis: Correction to a function where the specification was containing some contradictions. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Consequences if not approved: ⌘ Inconsistencies between 25.133 and 25.331. Misinterpretation of “detectable” cell.

Clauses affected: ⌘ 4.2.2.2;4.2.2.3;8.1.2.2;8.1.2.2.1;8.1.2.2.2;8.1.2.2.5;8.1.2.3;8.1.2.3.1;8.1.2.3.4;8.1.2.3.4;8.1.2.4.1;8.4.2.2;8.4.2.2.1;8.4.2.2.2;8.4.2.3;8.4.2.3.1

Other specs affected: ⌘ ☐ Other core specifications ⌘
☐ Test specifications

	☐ O&M Specifications	
Other comments:	⌘	

How to create CRs using this form:

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

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

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://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.

4.2.2.2 Measurements of intra-frequency cells

The UE shall measure CPICH Ec/Io and CPICH RSCP at least every $T_{measureFDD}$ (see table 4.1) for intra-frequency cells that are ~~detected~~ identified and measured according to the measurement rules. $T_{measureFDD}$ is defined in Table 4.1. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured intra-frequency cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureFDD}/2$.
The filtering shall be such that the UE shall be capable of evaluating that an intra-frequency cell has become better ranked than the serving cell within $T_{evaluateFDD}$ (see table 4.1), from the moment the intra-frequency cell became at least 3 dB better ranked than the current serving cell, provided that Treselection timer is set to zero and either CPICH Ec/Io or CPICH RSCP is used as measurement quantity for cell reselection.
If Treselection timer has a non zero value and the intra-frequency cell is better ranked than the serving cell, the UE shall evaluate this intra-frequency cell for the Treselection time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

4.2.2.3 Measurements of inter-frequency FDD cells

The UE shall measure CPICH Ec/Io and CPICH RSCP at least every $(N_{carrier}-1) * T_{measureFDD}$ (see table 4.1) for inter-frequency cells that are ~~detected~~ identified and measured according to the measurement rules. The parameter $N_{carrier}$ is the number of carriers used for FDD cells. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured inter-frequency cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureFDD}/2$.
If CPICH Ec/Io is used as measurement quantity for cell reselection, the filtering shall be such that the UE shall be capable of evaluating that an already ~~detected~~ identified inter-frequency cell has become better ranked than the serving cell within $(N_{carrier}-1) * T_{evaluateFDD}$ (see table 4.1) from the moment the inter-frequency cell became at least 3 dB better than the current serving cell provided that Treselection timer is set to zero. For non-~~detected~~ identified inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell has become better ranked than the serving cell within 30 s from the moment the inter-frequency cell became at least 3 dB better ranked than the current serving cell provided that Treselection timer is set to zero.
If CPICH RSCP is used as measurement quantity for cell reselection, the filtering shall be such that the UE shall be capable of evaluating that an already ~~detected~~ identified inter-frequency cell has become better ranked than the serving cell within $(N_{carrier}-1) * T_{evaluateFDD}$ from the moment the inter-frequency cell became at least 5 dB better than the current serving cell provided that Treselection timer is set to zero. For non-~~detected~~ identified inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell has become better ranked than the serving cell within 30 s from the moment the inter-frequency cell became at least 5 dB better ranked than the current serving cell provided that Treselection timer is set to zero.
If Treselection timer has a non zero value and the inter-frequency cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the Treselection time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

8.1.2.2 FDD intra frequency measurements

During the CELL_DCH state the UE shall continuously measure ~~detected~~ identified intra frequency cells and search for new intra frequency cells in the monitoring set. In case the network requests the UE to report ~~unlisted~~ detected set cells, the UE shall also search for intra frequency cells outside the monitored and active set. Cells, which are neither included in the active set nor in the monitored set, and are ~~detected~~ identified by the UE belong to the detected set according to TS 25.331. If compressed mode pattern sequences are activated, intra frequency measurements can be performed between the transmission gaps simultaneously for data reception from the active set cell/s.

8.1.2.2.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{identify\ \ intra} = Max\left\{800, T_{basic\ identify\ FDD,\ intra} \cdot \frac{T_{Measurement\ Period,\ Intra}}{T_{Intra}}\right\} ms$$

A cell shall be considered detectable when CPICH Ec/Io ≥ -20 dB, SCH_Ec/Io ≥ -20 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected

The UE shall be able to identify a new detectable cell not belonging to the monitored set within

$$T_{identify\ \ detected\ set} = 30s$$

when CPICH Ec/Io ≥ -20 dB, SCH_Ec/Io ≥ -17 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

8.1.2.2.2 UE CPICH measurement capability

In the CELL_DCH state the measurement period for intra frequency measurements is 200 ms. When no transmission gap pattern sequence is activated, the UE shall be capable of performing CPICH measurements for 8 ~~detected~~identified ~~-~~intra-frequency cells~~, in~~ of the monitored set and/or the active set, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When one or more transmission gap pattern sequences are activated, the UE shall be capable of performing CPICH measurements for at least $Y_{measurement\ intra}$ cells , where $Y_{measurement\ intra}$ is defined in the following equation. ~~The detectable cells, in the monitored set, that were not measured during that measurement period, shall be measured in the following measurement periods.~~ The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.1 and 9.1.2. If the UE has identified more than $Y_{measurement\ intra}$ cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{measurement\ intra} = Floor\left\{ X_{basic\ measurement\ FDD} \cdot \frac{T_{Intra}}{T_{Measurement\ Period,\ Intra}} \right\} \text{ cells}$$

where

$X_{basic\ measurement\ FDD}$ = 8 (cells)

$T_{Measurement\_Period\ Intra}$ = 200 ms. The measurement period for Intra frequency CPICH measurements.

T_{Intra} : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing.

$T_{basic\_identify\_FDD,\ intra}$ = 800 ms. This is the time period used in the intra frequency equation where the maximum allowed time for the UE to identify a new FDD cell is defined.

The UE shall furthermore be capable of performing CPICH measurements for at least 1 detected intra-frequency cell, in the detected set, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 10 s. The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.1 and 9.1.2.

8.1.2.2.5 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH . The delay uncertainty is twice the TTI of the uplink DCCH.

Editors Note: The test cases in section A.8 will need revisions to reflect the general requirements.

The event triggered measurement reporting delay, on cells belonging to monitored set, measured without L3 filtering, shall be less than the above defined $T_{identify\ intra}$. defined in Section 8.1.2.2.1

If a cell, belonging to monitored set, which the UE has ~~detected~~ identified and measured at least once over the measurement period, becomes undetectable for a period < 5 seconds and then the cell becomes detectable again and triggers an event, the measurement reporting delay shall be less than $T_{Measurement\_Period\ Intra}$ ms provided the timing to that cell has not changed more than +/-32 chips, the UE CPICH measurement capabilities of section 8.1.2.2.2 are valid and L3 filtering has not been used. When L3 filtering is used an additional delay can be expected.

If a cell belonging to monitored set has been detectable at least for the time period $T_{identify\_intra}$ and then enters the reporting range, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Intra}$ when the L3 filter has not been used and the UE CPICH measurement capabilities of Section 8.1.2.2.2 are valid.

The event triggered measurement reporting delay on cells not belonging to monitored set, measured without L3 filtering, shall be less than the above defined $T_{identify\ detected\ set}$. defined in Section 8.1.2.2.1.

8.1.2.3 FDD inter frequency measurements

In the CELL_DCH state when a transmission gap pattern sequence with the "FDD measurements" purpose is provided by the network the UE shall continuously measure ~~detected~~ identified inter frequency cells and search for new inter frequency cells indicated in the measurement control information.
In order for the requirements in the following subsections to apply the UTRAN must provide a transmission gap pattern sequence with measurement purpose FDD measurement using the following combinations for TGL1, TGL2 and TGD:

Table 8.1

TGL1 [slots]	TGL2 [slots]	TGD [slots]
7	-	undefined
14	-	undefined
10	-	undefined
7	7	15…269
14	14	15…269
10	5	15…269

8.1.2.3.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{\text{identify inter}} = Max\left\{5000, T_{\text{basic identify FDD,inter}} \cdot \frac{T_{\text{Measurement Period, Inter}}}{T_{\text{Inter}}} \cdot N_{Freq}\right\} ms$$

A cell shall be considered detectable when CPICH Ec/Io ≥ -20 dB, SCH_Ec/Io ≥ -17 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

8.1.2.3.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in section 9.
The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.
The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that ~~that~~ the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH . The delay uncertainty is twice the TTI of the uplink DCCH.
The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify inter}}$ defined in Section 8.1.2.3.1 When L3 filtering is used an additional delay can be expected.
If a cell has been detectable at least for the time period $T_{identify\_inter}$ and then enters the reporting range, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Inter}$ provided the timing to that cell has not changed more than +/-32 chips while transmission gap has not been available and the L3 filter has not been used.

8.1.2.4.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{\text{identify TDD inter}} = Max\left\{ 5000, T_{\text{basic identify TDD inter}} \cdot \frac{T_{\text{Measurement Period TDD inter}}}{T_{\text{TDD inter}}} \cdot N_{Freq} \right\} ms$$

A cell shall be considered detectable when P-CCPCH Ec/Io ≥ -8 dB, SCH_Ec/Io ≥ -13 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and the sum of all secondary synchronisation codes, where the secondary synchronisation codes are also equally divided. When L3 filtering is used an additional delay can be expected.

Where the received P-CCPCH E_c/I_o is defined as

$$\left(\frac{P-CCPCH\_E_c}{I_o} \right)_{in\ dB} = \left(\frac{P-CCPCH\_E_c}{I_{or}} \right)_{in\ dB} - \left(\frac{I_o}{\hat{I}_{or}} \right)_{in\ dB}$$

and the received SCH E_c/I_o is defined as

$$\left(\frac{SCH\_E_c}{I_o} \right)_{in\ dB} = \left(\frac{SCH\_E_c}{I_{or}} \right)_{in\ dB} - \left(\frac{I_o}{\hat{I}_{or}} \right)_{in\ dB}$$

8.4.2.2 FDD intra frequency measurements

During the CELL_FACH state the UE shall continuously measure ~~detected~~ identified intra frequency cells and search for new intra frequency cells in the monitoring set. If a measurement occasion is activated, intra frequency measurements can be performed between the measurement occasions.

8.4.2.2.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{identify,intra} = Max\left\{800, Ceil\left\{\frac{T_{basic\ identify\ FDD,intra}}{N_{TTI}\cdot(M\_REP-1)\cdot 10}\right\}\cdot N_{TTI}\cdot M\_REP\cdot 10\right\}\ ms$$

where

$T_{basic\_identify\_FDD,\ intra}$ is specified in section 8.1.2.2.2,

N_{TTI} and M_REP is specified in section 8.4.2.1.

A cell shall be considered detectable ~~and~~ when CPICH Ec/Io ≥ -20 dB, SCH_Ec/Io ≥ -20 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code.

8.4.2.2.2 UE CPICH measurement capability

In the CELL_FACH state the measurement period for intra frequency measurements is 200 ms. When no measurement occasion sequence is activated, the UE shall be capable of performing CPICH measurements for 8 ~~detected~~ identified intra-frequency cells of the monitored set and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When one measurement occasion sequence is activated, the UE shall be capable of performing CPICH measurements for the $Y_{\text{measurement intra}}$ strongest cells , where $Y_{\text{measurement intra}}$ is defined in the following equation. The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.1 and 9.1.2. If the UE has identified more than $Y_{\text{measurement intra}}$ cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{\text{measurement intra}} = Floor\left\{ X_{\text{basic measurement FDD}} \cdot \frac{T_{\text{Measurement\_Period Intra}} - Ceil\left\{ \frac{T_{\text{Measurement\_Period Intra}}}{N_{TTI} \cdot M\_REP \cdot 10\,\text{ms}} \right\} \cdot N_{TTI} \cdot 10\,\text{ms}}{T_{\text{Measurement\_Period Intra}}} \right\}$$

cells

where

$X_{\text{basic measurement FDD}}$ is specified in section 8.1.2.2.2,

$T_{\text{Measurement\_Period Intra}}$ is specified in section 8.1.2.2.2,

M_REP and N_{TTI} is specified in section 8.4.2.1.

8.4.2.3 FDD inter frequency measurements

In the CELL_FACH state when a measurement occasion cycle is provided by the network the UE shall continuously measure ~~detected~~ identified inter frequency cells and search for new inter frequency cells indicated in the measurement control information.

8.4.2.3.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{identify,\ inter} = Max\left\{5000, Ceil\left\{\frac{T_{basic\ identify\ FDD\ inter}}{T_{Inter\ FACH}}\right\} \cdot T_{meas} \cdot N_{Freq,FDD}\right\} \text{ ms}$$

where

$T_{basic\_identify\_FDD,inter}$ is specified in 8.1.2.3.2.

$N_{Freq,FDD}$: Number of FDD frequencies in the Inter-frequency cell info list

T_{Meas} and M_REP are specified in 8.4.2.1.

$T_{Inter\ FACH} = (N_{TTI}*10 - 2*0.5)$ ms

A cell shall be considered detectable ~~and~~ when CPICH Ec/Io $\geq$ -20 dB, SCH_Ec/Io $\geq$ -17 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code.

3GPP TSG RAN WG4 Meeting #20 **R4-011645**
East Brunswick, NJ, USA 12th - 16th November 2001

CR-Form-v4

CHANGE REQUEST

⌘ **25.133 CR 222** ⌘ ev **-** ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	Inconsistent use of “sets of cells” with respect to definition of RRC specs.
Source:	⌘	RAN WG4
Work item code:	⌘	***Date:*** ⌘ 2001-11-15
Category:	⌘	**A** ***Release:*** ⌘ Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
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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)

Reason for change: ⌘ The term “detected” used in TS25.133 is not in accordance with definition of sets of cells given in TS25.331, section 8.4 (RRC specification). Clarification of “detectable” cell.

Summary of change: ⌘
1. Clarify the word ”detectable”.
2. Align use of the word “detected” with definitions of 25.331 : “detected” is used only for “detected set” and replaced by ”identified” otherwise.
3. Align use of “set of cells” with TS 25.331.
4. The sentence “ *The detectable cells, in the monitored set, that were not measured during that measurement period, shall be measured in the following measurement periods*” is removed and clarified by the following sentence in stead "*If the UE has identified more than Ymeasurement intra cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased."*

Isolated Impact Analysis: Correction to a function where the specification was containing some contradictions. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Consequences if not approved: ⌘ Inconsistencies between 25.133 and 25.331. Misinterpretation of “detectable” cell.

Clauses affected: ⌘ 4.2.2.2;4.2.2.3;8.1.2.2;8.1.2.2.1;8.1.2.2.2;8.1.2.2.5;8.1.2.3;8.1.2.3.1;8.1.2.3.4;8.1.2.3.4;8.1.2.4.1;8.4.2.2;8.4.2.2.1;8.4.2.2.2;8.4.2.3;8.4.2.3.1

Other specs affected: ⌘ ☐ Other core specifications ⌘
☐ Test specifications

	☐ 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.

4.2.2.2 Measurements of intra-frequency cells

The UE shall measure CPICH Ec/Io and CPICH RSCP at least every $T_{measureFDD}$ (see table 4.1) for intra-frequency cells that are ~~detected~~ identified and measured according to the measurement rules. $T_{measureFDD}$ is defined in Table 4.1. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured intra-frequency cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureFDD}/2$.
The filtering shall be such that the UE shall be capable of evaluating that an intra-frequency cell has become better ranked than the serving cell within $T_{evaluateFDD}$ (see table 4.1), from the moment the intra-frequency cell became at least 3 dB better ranked than the current serving cell, provided that Treselection timer is set to zero and either CPICH Ec/Io or CPICH RSCP is used as measurement quantity for cell reselection.
If Treselection timer has a non zero value and the intra-frequency cell is better ranked than the serving cell, the UE shall evaluate this intra-frequency cell for the Treselection time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

4.2.2.3 Measurements of inter-frequency FDD cells

The UE shall measure CPICH Ec/Io and CPICH RSCP at least every $(N_{carrier}-1) * T_{measureFDD}$ (see table 4.1) for inter-frequency cells that are ~~detected~~ identified and measured according to the measurement rules. The parameter $N_{carrier}$ is the number of carriers used for FDD cells. The UE shall filter CPICH Ec/Io and CPICH RSCP measurements of each measured inter-frequency cell using at least 2 measurements, which are taken so that the time difference between the measurements is at least $T_{measureFDD}/2$.
If CPICH Ec/Io is used as measurement quantity for cell reselection, the filtering shall be such that the UE shall be capable of evaluating that an already ~~detected~~ identified inter-frequency cell has become better ranked than the serving cell within $(N_{carrier}-1) * T_{evaluateFDD}$ (see table 4.1) from the moment the inter-frequency cell became at least 3 dB better than the current serving cell provided that Treselection timer is set to zero. For non-~~detected~~ identified inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell has become better ranked than the serving cell within 30 s from the moment the inter-frequency cell became at least 3 dB better ranked than the current serving cell provided that Treselection timer is set to zero.
If CPICH RSCP is used as measurement quantity for cell reselection, the filtering shall be such that the UE shall be capable of evaluating that an already ~~detected~~ identified inter-frequency cell has become better ranked than the serving cell within $(N_{carrier}-1) * T_{evaluateFDD}$ from the moment the inter-frequency cell became at least 5 dB better than the current serving cell provided that Treselection timer is set to zero. For non-~~detected~~ identified inter-frequency cells, the filtering shall be such that the UE shall be capable of evaluating that inter-frequency cell has become better ranked than the serving cell within 30 s from the moment the inter-frequency cell became at least 5 dB better ranked than the current serving cell provided that Treselection timer is set to zero.
If Treselection timer has a non zero value and the inter-frequency cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the Treselection time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

8.1.2.2 FDD intra frequency measurements

During the CELL_DCH state the UE shall continuously measure ~~detected~~ identified intra frequency cells and search for new intra frequency cells in the monitoring set. In case the network requests the UE to report ~~unlisted~~ detected set cells, the UE shall also search for intra frequency cells outside the monitored and active set. Cells, which are neither included in the active set nor in the monitored set, and are ~~detected~~ identified by the UE belong to the detected set according to TS 25.331. If compressed mode pattern sequences are activated, intra frequency measurements can be performed between the transmission gaps simultaneously for data reception from the active set cell/s.

8.1.2.2.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{identify\ \ intra} = Max\left\{800, T_{basic\ identify\ FDD,\ intra} \cdot \frac{T_{Measurement\ Period,\ Intra}}{T_{Intra}}\right\} ms$$

A cell shall be considered detectable when CPICH Ec/Io ≥ -20 dB, SCH_Ec/Io ≥ -20 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected

The UE shall be able to identify a new detectable cell not belonging to the monitored set within

$$T_{identify\ \ detected\ set} = 30s$$

when CPICH Ec/Io ≥ -20 dB, SCH_Ec/Io ≥ -17 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

8.1.2.2.2 UE CPICH measurement capability

In the CELL_DCH state the measurement period for intra frequency measurements is 200 ms. When no transmission gap pattern sequence is activated, the UE shall be capable of performing CPICH measurements for 8 ~~detected~~identified ~~-~~intra-frequency cells~~, in~~ of the monitored set and/or the active set, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When one or more transmission gap pattern sequences are activated, the UE shall be capable of performing CPICH measurements for at least $Y_{measurement\ intra}$ cells , where $Y_{measurement\ intra}$ is defined in the following equation. ~~The detectable cells, in the monitored set, that were not measured during that measurement period, shall be measured in the following measurement periods.~~ The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.1 and 9.1.2. If the UE has identified more than $Y_{measurement\ intra}$ cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{measurement\ intra} = Floor\left\{ X_{basic\ measurement\ FDD} \cdot \frac{T_{Intra}}{T_{Measurement\ Period,\ Intra}} \right\} \text{ cells}$$

where

$X_{basic\ measurement\ FDD}$ = 8 (cells)

$T_{Measurement\_Period\ Intra}$ = 200 ms. The measurement period for Intra frequency CPICH measurements.

T_{Intra} : This is the minimum time that is available for intra frequency measurements, during the measurement period with an arbitrarily chosen timing.

$T_{basic\_identify\_FDD,\ intra}$ = 800 ms. This is the time period used in the intra frequency equation where the maximum allowed time for the UE to identify a new FDD cell is defined.

The UE shall furthermore be capable of performing CPICH measurements for at least 1 detected intra-frequency cell, in the detected set, and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 10 s. The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.1 and 9.1.2.

8.1.2.2.5 Event Triggered Reporting

Reported measurements contained in event triggered measurement reports shall meet the requirements in section 9.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit over the Uu interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH . The delay uncertainty is twice the TTI of the uplink DCCH.

Editors Note: The test cases in section A.8 will need revisions to reflect the general requirements.

The event triggered measurement reporting delay, on cells belonging to monitored set, measured without L3 filtering, shall be less than the above defined $T_{identify\ intra}$. defined in Section 8.1.2.2.1

If a cell, belonging to monitored set, which the UE has ~~detected~~ identified and measured at least once over the measurement period, becomes undetectable for a period < 5 seconds and then the cell becomes detectable again and triggers an event, the measurement reporting delay shall be less than $T_{Measurement\_Period\ Intra}$ ms provided the timing to that cell has not changed more than +/-32 chips, the UE CPICH measurement capabilities of section 8.1.2.2.2 are valid and L3 filtering has not been used. When L3 filtering is used an additional delay can be expected.

If a cell belonging to monitored set has been detectable at least for the time period $T_{identify\_intra}$ and then enters the reporting range, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Intra}$ when the L3 filter has not been used and the UE CPICH measurement capabilities of Section 8.1.2.2.2 are valid.

The event triggered measurement reporting delay on cells not belonging to monitored set, measured without L3 filtering, shall be less than the above defined $T_{identify\ detected\ set}$. defined in Section 8.1.2.2.1.

8.1.2.3 FDD inter frequency measurements

In the CELL_DCH state when a transmission gap pattern sequence with the "FDD measurements" purpose is provided by the network the UE shall continuously measure ~~detected~~ identified inter frequency cells and search for new inter frequency cells indicated in the measurement control information.
In order for the requirements in the following subsections to apply the UTRAN must provide a transmission gap pattern sequence with measurement purpose FDD measurement using the following combinations for TGL1, TGL2 and TGD:

Table 8.1

TGL1 [slots]	TGL2 [slots]	TGD [slots]
7	-	undefined
14	-	undefined
10	-	undefined
7	7	15…269
14	14	15…269
10	5	15…269

8.1.2.3.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{\text{identify inter}} = Max\left\{5000, T_{\text{basic identify FDD,inter}} \cdot \frac{T_{\text{Measurement Period, Inter}}}{T_{\text{Inter}}} \cdot N_{Freq}\right\} ms$$

A cell shall be considered detectable when CPICH Ec/Io ≥ -20 dB, SCH_Ec/Io ≥ -17 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code. When L3 filtering is used an additional delay can be expected.

8.1.2.3.4 Event Triggered Reporting

Reported measurements in event triggered measurement reports shall meet the requirements in section 9.
The UE shall not send any event triggered measurement reports, as long as the reporting criteria is not fulfilled.
The measurement reporting delay is defined as the time between any event that will trigger a measurement report until the UE starts to transmit the measurement report over the Uu interface. This requirement assumes that ~~that~~ the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH . The delay uncertainty is twice the TTI of the uplink DCCH.
The event triggered measurement reporting delay, measured without L3 filtering shall be less than $T_{\text{identify inter}}$ defined in Section 8.1.2.3.1 When L3 filtering is used an additional delay can be expected.
If a cell has been detectable at least for the time period $T_{identify\_inter}$ and then enters the reporting range, the event triggered measurement reporting delay shall be less than $T_{Measurement\_Period\ Inter}$ provided the timing to that cell has not changed more than +/-32 chips while transmission gap has not been available and the L3 filter has not been used.

8.1.2.4.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{\text{identify TDD inter}} = Max\left\{ 5000, T_{\text{basic identify TDD inter}} \cdot \frac{T_{\text{Measurement Period TDD inter}}}{T_{\text{TDD inter}}} \cdot N_{Freq} \right\} ms$$

A cell shall be considered detectable when P-CCPCH Ec/Io ≥ -8 dB, SCH_Ec/Io ≥ -13 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and the sum of all secondary synchronisation codes, where the secondary synchronisation codes are also equally divided. When L3 filtering is used an additional delay can be expected.

Where the received P-CCPCH E_c/I_o is defined as

$$\left(\frac{P-CCPCH\_E_c}{I_o} \right)_{in\ dB} = \left(\frac{P-CCPCH\_E_c}{I_{or}} \right)_{in\ dB} - \left(\frac{I_o}{\hat{I}_{or}} \right)_{in\ dB}$$

and the received SCH E_c/I_o is defined as

$$\left(\frac{SCH\_E_c}{I_o} \right)_{in\ dB} = \left(\frac{SCH\_E_c}{I_{or}} \right)_{in\ dB} - \left(\frac{I_o}{\hat{I}_{or}} \right)_{in\ dB}$$

8.4.2.2 FDD intra frequency measurements

During the CELL_FACH state the UE shall continuously measure ~~detected~~ identified intra frequency cells and search for new intra frequency cells in the monitoring set. If a measurement occasion is activated, intra frequency measurements can be performed between the measurement occasions.

8.4.2.2.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{identify,intra} = Max\left\{800, Ceil\left\{\frac{T_{basic\ identify\ FDD,intra}}{N_{TTI}\cdot(M\_REP-1)\cdot 10}\right\}\cdot N_{TTI}\cdot M\_REP\cdot 10\right\}\ ms$$

where

$T_{basic\_identify\_FDD,\ intra}$ is specified in section 8.1.2.2.2,

N_{TTI} and M_REP is specified in section 8.4.2.1.

A cell shall be considered detectable ~~and~~ when CPICH Ec/Io ≥ -20 dB, SCH_Ec/Io ≥ -20 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code.

8.4.2.2.2 UE CPICH measurement capability

In the CELL_FACH state the measurement period for intra frequency measurements is 200 ms. When no measurement occasion sequence is activated, the UE shall be capable of performing CPICH measurements for 8 ~~detected~~ identified intra-frequency cells of the monitored set and the UE physical layer shall be capable of reporting measurements to higher layers with the measurement period of 200 ms. When one measurement occasion sequence is activated, the UE shall be capable of performing CPICH measurements for the $Y_{\text{measurement intra}}$ strongest cells , where $Y_{\text{measurement intra}}$ is defined in the following equation. The measurement accuracy for all measured cells shall be as specified in the sub-clause 9.1.1 and 9.1.2. If the UE has identified more than $Y_{\text{measurement intra}}$ cells, the UE shall perform measurements of all identified cells but the reporting rate of CPICH measurements of cells from UE physical layer to higher layers may be decreased.

$$Y_{\text{measurement intra}} = Floor\left\{ X_{\text{basic measurement FDD}} \cdot \frac{T_{\text{Measurement\_Period Intra}} - Ceil\left\{ \frac{T_{\text{Measurement\_Period Intra}}}{N_{TTI} \cdot M\_REP \cdot 10\,\text{ms}} \right\} \cdot N_{TTI} \cdot 10\,\text{ms}}{T_{\text{Measurement\_Period Intra}}} \right\}$$

cells

where

$X_{\text{basic measurement FDD}}$ is specified in section 8.1.2.2.2,

$T_{\text{Measurement\_Period Intra}}$ is specified in section 8.1.2.2.2,

M_REP and N_{TTI} is specified in section 8.4.2.1.

8.4.2.3 FDD inter frequency measurements

In the CELL_FACH state when a measurement occasion cycle is provided by the network the UE shall continuously measure ~~detected~~ identified inter frequency cells and search for new inter frequency cells indicated in the measurement control information.

8.4.2.3.1 Identification of a new cell

The UE shall be able to identify a new detectable cell belonging to the monitored set within

$$T_{identify,\ inter} = Max\left\{5000, Ceil\left\{\frac{T_{basic\ identify\ FDD\ inter}}{T_{Inter\ FACH}}\right\} \cdot T_{meas} \cdot N_{Freq,FDD}\right\} \text{ ms}$$

where

$T_{basic\_identify\_FDD,inter}$ is specified in 8.1.2.3.2.

$N_{Freq,FDD}$: Number of FDD frequencies in the Inter-frequency cell info list

T_{Meas} and M_REP are specified in 8.4.2.1.

$T_{Inter\ FACH} = (N_{TTI}*10 - 2*0.5)$ ms

A cell shall be considered detectable ~~and~~ when CPICH Ec/Io $\geq$ -20 dB, SCH_Ec/Io $\geq$ -17 dB and SCH_Ec/Ior is equally divided between primary synchronisation code and secondary synchronisation code.