

**Agenda item:** AH 16  
**Source:** Ericsson  
**Title:** Text proposal for section 1 to 6 and 8 in TS 25.215  
**Document for:** Approval

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## 1 Introduction

The aim of this contribution is to cleanup some inconsistencies and unnecessary information in section 1 to 6 and 8 of TS 25.215.

The following changes are proposed:

- Remove the purpose field in section 6 of 25.215.  
The purpose of a measurement is not an issue for WG1 and shall not be listed in the specification.
- Remove “TBD.” from the “Range/Mapping” field in section 6 of 25.215.
- Remove the notation for Idle and Connected mode (I/C) for UTRAN measurements in the table in section 6.2.  
Idle and Connected mode is not relevant for UTRAN.
- Remove the columns for Intra-frequency and Inter-frequency for UTRAN measurements in the table in section 6.2.  
Specification of measurement on intra-frequencies and inter-frequencies is not relevant for UTRAN.
- Removal of overview tables directly below section 6.1 and 6.2.  
Measurement structure in section 6 has been aligned with the WG2 liaison R2-99d32 “Liaison statement to WG1 on measurement naming”, where it is stated that the naming of the measurements shall uniquely define on which physical channel the measurement shall be performed. This means that the overview tables directly under section 6.1 and 6.2 no longer are needed. For measurement quantities where it is possible to measure them on several physical channels that measurement has been divided into one measurement per physical channel. For example the RSCP shall be possible for both CPICH and DPCCH and therefore two RSCP measurements are defined, e.g. CPICH RSCP and DPCCH RSCP. The text in the tables regarding which physical channel to measure has been inserted in the definition of the measurement quantity.
- Insertion of new row in definition tables in section 6.1.  
In relation with the removal of the overview tables in section 6.1 a new row has been created in the tables where the measurements are defined. The new row is called “Applicable for” and shall hold information on if the measurement shall be possible on Intra and/or Inter frequency and also if it shall be possible in Idle and/or Connected mode, as previously indicated in the table directly below section 6.1.
- Adding text on control of UE/UTRAN measurement in section 5. The text is taken from contribution R1-99f42 Proposal for modifications in TS 25.225 Physical Layer – Measurements (TDD), Siemens.
- Adding text in section 1, 2, 3 and 4, taken from contribution R1-99f42 Proposal for modifications in TS 25.225 Physical Layer – Measurements (TDD), Siemens.
- Removal of section 8 containing information on removal of paragraphs from the original TS 25.231 v0.3.1.

Text proposals for the changes can be found in section 2.

## 2 Text Proposal for TS 25.215

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### 1 Intellectual Property Rights

*<editor's note : this section will be completed when an official format for the document is agreed>*

<IPR notice shall be provided once correct notice is available within 3GPP>

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### 2 Foreword

This Technical Specification (TS) has been produced by the 3G Partnership Project (3GPP) of the European Telecommunications Standards Institute (ETSI).

The contents of this TS are subject to change as the work continues

This Technical Specification has been produced by the 3GPP.

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of this TS, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 Indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the specification;

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### 3 Scope

*<Editor's note: This section needs to be updated once the scope of the document is determined.>*

This 3GPP Telecommunication Specification TS contains the description and definition of the measurements for FDD done at the UE and network in order to support operation in idle mode and connected mode.

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### 4 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, subsequent revisions do apply.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1]	3GPP RAN <u>TS 25.211</u>	Transport channels and physical channels (FDD)
[2]	3GPP RAN <u>TS 25.212</u>	Multiplexing and channel coding (FDD)
[3]	3GPP RAN <u>TS 25.213</u>	Spreading and modulation (FDD)
[4]	3GPP RAN <u>TS 25.214</u>	Physical layer procedures (FDD)
[5]	3GPP RAN <u>TS 25.215</u>	Physical layer measurements (FDD)
[65]	3GPP RAN <u>TS 25.221</u>	Transport channels and physical channels (TDD)
[76]	3GPP RAN <u>TS 25.222</u>	Multiplexing and channel coding (TDD)
[87]	3GPP RAN <u>TS 25.223</u>	Spreading and modulation (TDD)
[98]	3GPP RAN <u>TS 25.224</u>	Physical layer procedures (TDD)
[10]	3GPP RAN <u>TS 25.301</u>	Radio Interface Protocol Architecture
[119]	3GPP RAN <u>TS 25.302</u>	Services provided by the Physical layer
[120]	3GPP RAN <u>TS 25.303</u>	UE functions and interlayer procedures in connected mode
[134]	3GPP RAN <u>TS 25.304</u>	UE procedures in idle mode
[14]	3GPP RAN <u>TS 25.331</u>	RRC Protocol Specification
[15]	3GPP RAN <u>TR 25.922</u>	Radio Resource Management Strategies
[16]	3GPP RAN <u>TR 25.923</u>	Report on Location Services (LCS)
[12]	<del>XX.15, version 1.0.0</del>	<del>UTRA Handover</del>
[13]	<del>XX.07, version 1.0.0</del>	<del>UTRA FDD, Physical layer procedures</del>
[14]	<del>XX.13, version 1.0.0</del>	<del>UTRA TDD, Physical layer procedures</del>
[15]	<del>ARIB, Vol 3</del>	

## 5 Control of UE/UTRAN measurements

~~<Editors note: In this chapter the general measurement control concept defined in WG2 of the higher layers is shall briefly be described to get provide an understanding on how L1 measurements are initiated and controlled by higher layers. It shall be described how measurements are controlled both in idle and connected mode. In WG2 a measurement control concept are defined, where higher layers controls what to measure, how often to measure, when to report (criteria), filtering of measured value.>~~

L1 provides with the measurement specifications a toolbox of measurement abilities for the UE and the UTRAN. These measurements can be differentiated in different measurement types: intra-frequency, inter-frequency, inter-system, traffic volume, quality and internal measurements (see [14]).

In the L1 measurement specifications the measurements, see chapter 6, are distinguished between measurements in the UE (the messages will be described in the RRC Protocol) and measurements in the UTRAN (the messages will be described in the NBAP and the Frame Protocol).

To initiate a specific measurement the UTRAN transmits a ‘measurement control message’ to the UE including a measurement ID and type, a command (setup, modify, release), the measurement objects and quantity, the reporting quantities, criteria (periodical/event-triggered) and mode (acknowledged/unacknowledged), see [14].

When the reporting criteria is fulfilled the UE shall answer with a ‘measurement report message’ to the UTRAN including

the measurement ID and the results.

In idle mode the measurement control message is broadcast in a System Information.

Intra-frequency reporting events, traffic volume reporting events and UE internal measurement reporting events described in [14] define events which trigger the UE to send a report to the UTRAN. This defines a toolbox from which the UTRAN can choose the needed reporting events.

## 6 Measurement abilities for UTRA/FDD

~~<Editors note: In this chapter definitions of the physical layer measurements reported to higher layers -measurements required by WG2, L1 measurements reported to higher layers, shall be made. (this mMay be also include UE internal measurements (not reported over the air-interface) are shall be defined.?)>~~

~~<Editors note: Filtering/averaging is not included in the L1 specification at the moment. However, it would be beneficial to continue the discussion on this issue via email.>~~

### 6.1 UE measurement abilities

The following table provides an overview of the UE measurement abilities:

Note: The term "Measurement target" refers to either physical channel(s), carrier, transport channel, channelisation code, etc.

Measurement ability	Measurement target on which the measurement shall be possible (Idle mode = I / Connected mode = C)	
	Intra-frequency	Inter-frequency
RSCP	CPICH (I/C), DPCH measured on DPCCH for each RL and after RL combination (C)	CPICH (I/C)
SIR	DPCH measured on DPCCH for each RL and after RL combination (C)	n.a.
RSSI	UTRAN DL carrier (I/C)	UTRAN DL carrier (I/C), GSM BCCH carrier (I/C).
$E_c/N_o$	CPICH (I/C), DPCH measured on DPCCH for each RL and after RL combination (C)	CPICH (I/C)
Transport CH BER	Transport channel DCH carried by physical channel DPCH after RL combination (C)	n.a.
Physical CH BER	Transport channel DCH carried by physical channel DPCH after RL combination (C)	n.a.
UE TX Power	DPCCH/DPDCH (C)	n.a.
Relative Timing Difference Between Cells	CPICH (C)	n.a.
UE RxTx timing	DPCH (C)	n.a.
Relative Timing Difference Between Cells for LCS	CPICH (TBD.)	CPICH (TBD.)

The structure of the table defining a UE measurement quantity is shown below:

<u>Column field</u>	<u>Comment</u>
<u>Definition</u>	<u>Contains the definition of the measurement.</u>
<u>Applicable for</u>	<u>Contains if the measurement shall be possible to perform on inter-frequency and/or intra-frequency. Also information on if the measurement shall be possible in Idle (I) and/or Connected (C) mode is stated here.</u>
<u>Range/mapping</u>	<u>Gives the range and mapping to bits for the measurements quantity.</u>

### 6.1.1 CPICH\_RSCP

<b>Definition</b>	Received Signal Code Power, the received power on one code after de-spreading measured on the pilot bits of the <u>CPICH</u> . The reference point for the RSCP is the antenna connector at the UE.
<b>Purpose</b>	<del>Handover evaluation (CPICH of own and neighbour cells), DL open loop power control (DPCCH), calculation of SIR (DPCCH) pathloss (CPICH of own and neighbour cells).</del>
<b><u>Applicable for</u></b>	<u>Intra-frequency (I/C), Inter-frequency (I/C)</u>
<b>Range/mapping</b>	<del>TBD.</del>

### 6.1.2 DPCCH\_RSCP

<b><u>Definition</u></b>	<u>Received Signal Code Power, the received power on one code after de-spreading measured on the pilot bits of the DPCCH after RL combination. The reference point for the RSCP is the antenna connector at the UE.</u>
<b><u>Applicable for</u></b>	<u>Intra-frequency (C)</u>
<b><u>Range/mapping</u></b>	

### 6.1.32 ISCP

Note that it is not a requirement that the ISCP shall be possible to report to higher layers. The ISCP is defined in this section because it is included in the definition of SIR.

<b>Definition</b>	Interference Signal Code Power, the interference on the received signal after de-spreading. Only the non-orthogonal part of the interference is included in the measurement. The reference point for the ISCP is the antenna connector at the UE.
<b>Purpose</b>	<del>Calculation of SIR (DPCCH).</del>

### 6.1.43 SIR

<b>Definition</b>	Signal to Interference Ration, defined as the RSCP divided by ISCP. <u>The SIR shall be measured on DPCCH after RL combination.</u> The reference point for the SIR is the antenna connector of the UE.
<b>Purpose</b>	<del>DL inner/outer loop power control (DPCCH), DL open loop power control (DPCCH), initial power setting (DPCCH).</del>

<b>Applicable for</b>	Intra-frequency (C)
<b>Range/mapping</b>	TBD.

### 6.1.54 UTRA Carrier RSSI

<b>Definition</b>	Received Signal Strength Indicator, the wide-band received power within the relevant channel bandwidth. Measurement shall be performed on a UTRAN DL carrier. The reference point for the RSSI is the antenna connector at the UE.
<b>Purpose</b>	Inter-system handover (GSM BCCH carrier), load control (UTRAN DL carrier).
<b>Applicable for</b>	Intra-frequency (I/C), Inter-frequency (I/C)
<b>Range/mapping</b>	UTRAN: TBD. GSM: according to the definition of RXLEV in GSM 05.08.

### 6.1.6 GSM Carrier RSSI

<b>Definition</b>	Received Signal Strength Indicator, the wide-band received power within the relevant channel bandwidth. Measurement shall be performed on a GSM BCCH carrier. The reference point for the RSSI is the antenna connector at the UE.
<b>Applicable for</b>	Inter-frequency (I/C)
<b>Range/mapping</b>	According to the definition of RXLEV in GSM 05.08.

### 6.1.75 CPICH Ec/No

<b>Definition</b>	The received energy per chip divided by the power density in the band. The Ec/No is identical to RSCP/RSSI. Measurement shall be performed on the CPICH. The reference point for Ec/No is the antenna connector at the UE.
<b>Purpose</b>	Cell selection/re-selection (CPICH of own and neighbour cells), handover evaluation (CPICH of own and neighbour cells).
<b>Applicable for</b>	Intra-frequency (I/C), Inter-frequency (I/C)
<b>Range/mapping</b>	TBD.

### 6.1.8 DPCCH Ec/No

<b>Definition</b>	The received energy per chip divided by the power density in the band. The Ec/No is identical to RSCP/RSSI. Measurement shall be performed on the DPCCH after RL combination. The reference point for Ec/No is the antenna connector at the UE.
<b>Applicable for</b>	Intra-frequency (C)
<b>Range/mapping</b>	

### 6.1.96 Transport CH BLER

<b>Definition</b>	Estimation of the transport channel block error rate (BLER). The BLER estimation shall be based on evaluating the CRC on each transport block. <u>Measurement shall be performed on transport channel DPCH carried by physical channel DPCH after RL combination.</u>
<b>Purpose</b>	<del>Outer loop power control (transport channel DCH).</del>
<b>Applicable for</b>	<u>Intra-frequency (C)</u>
<b>Range/mapping</b>	<del>TBD.</del>

### 6.1.107 Physical CH BER

<b>Definition</b>	The physical channel BER is an estimation of the average bit error rate (BER) before channel decoding of the data. <u>Measurement shall be performed on transport channel DCH carried by physical channel DPCH after RL combination.</u>
<b>Purpose</b>	<del>Outer loop power control (DPCH).</del>
<b>Applicable for</b>	<u>Intra-frequency (C)</u>
<b>Range/mapping</b>	<del>TBD.</del>

### 6.1.118 UE TX Power

<b>Definition</b>	The total UE transmitted power on one carrier measured on DPCCH/DPDCH. The reference point for the UE TX Power shall be the UE antenna connector.
<b>Purpose</b>	<del>Monitoring if the average Tx power is reaching an upper or lower power limit, either connected to the UE capability or set by the network (DPCCH/DPDCH).</del>
<b>Applicable for</b>	<u>Intra-frequency (C)</u>
<b>Range/mapping</b>	<del>TBD.</del>

### 6.1.129 Relative Timing Difference Between Cells

<b>Definition</b>	The relative timing difference between cells $T_m$ is defined as $T_m =  T_{UEtx} - T_o - T_{CPICH} $ where: <ul style="list-style-type: none"> <li>- <math>T_{UEtx}</math> is the time when the UE transmits an uplink DPCCH/DPDCH frame.</li> <li>- <math>T_o</math> is a constant timing offset between the first received DPCH frame in the UE and the following uplink DPCCH/DPDCH frame. <math>T_o</math> is used to set up the transmission frame timing in the UE and given in number of chips.</li> <li>- <math>T_{CPICH}</math> = the time for the earliest received downlink CPICH path of the target cell in the UE.</li> </ul>
<b>Purpose</b>	<del>Cell timing measurement for soft handover (CPICH of neighbour cells).</del>
<b>Applicable for</b>	<u>Intra-frequency (C)</u>

<b>Range/mapping</b>	$T_m$ is an absolute value and is therefore always positive. $T_m$ is given in chip units and has a range of [0...38400-1] chips.
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### 6.1.130 UE RxTx timing

<b>Definition</b>	The difference in time between the UE uplink DPCCH/DPDCH frame transmission and the first significant path, of the downlink DPCH frame from the measured radio link. Measurement shall be made for each cell included in the active set.  Note: The definition of "first significant path" needs further elaboration.
<b>Purpose</b>	<del>Estimation of the path delay and the distance between and UTRAN access point and the UE (DPCH).</del>
<b>Applicable for</b>	<u>Intra-frequency (C)</u>
<b>Range/mapping</b>	Always positive.

### 6.1.144 Relative Timing Difference Between Cells for LCS

<b>Definition</b>	The relative timing difference between the serving cell and cell i. $T_{LCSi}$ is defined as $T_{LCSi} = T_{CPICHR_{xi}} - T_{CPICHR_{x0}}$ , where:  $T_{CPICHR_{x0}}$ is the time when the UE receives one CPICH slot from the serving cell  $T_{CPICHR_{xi}}$ is the time when the UE receives the CPICH slot from cell i that is closest in time to the CPICH slot received from the serving cell
<b>Purpose</b>	<del>Location services (CPICH of own and neighbour cells)</del>
<b>Applicable for</b>	<u>Intra-frequency (TBD.), Inter-frequency (TBD.)</u>
<b>Range/mapping</b>	$T_{LCS}$ is a signed value. The resolution of $T_{LCS}$ is 0.5 chip and the range is [-1279...1280] chips.

## 6.2 UTRAN measurement abilities

The following table provides an overview of the UE measurement abilities:

Note: The term "Measurement target" refers to either physical channel(s), carrier, transport channel, channelisation code, etc.

Measurement ability	Measurement target on which the measurement shall be possible (Idle mode = I / Connected mode = C)	
	Intra-frequency	Inter-frequency
RSSI	UTRAN UL carrier	
SIR	DPCCH/DPDCH measured on DPCCH after RL combination in Node B (C)	n.a.
Total Transmitted Power	Any carrier transmitted from an UTRAN access point	
Transmitted Code Power	Any channelisation code transmitted from an UTRAN access point	



Measurement ability	Measurement target on which the measurement shall be possible (Idle mode= I / Connected mode = C)	
	Intra-frequency	Inter-frequency
Transport CH BLER	Transport channel DCH carried by physical channel DPDCH after RL combination in Node B (C)	n.a.
Physical CH BER	Transport channel DCH carried by physical channel DPDCH after RL combination in Node B (C)	n.a.
Round Trip Delay (RTD)	DPCCH for each RL transmitted from an UTRAN access point and DPDCH/DPCCH for each RL received in an UTRAN access point (C)	n.a.

The structure of the table defining a UTRAN measurement quantity is shown below:

Column field	Comment
Definition	Contains the definition of the measurement.
Range/mapping	Gives the range and mapping to bits for the measurements quantity.

## 6.2.1 RSSI

<b>Definition</b>	Received Signal Strength Indicator, the wide-band received power within the UTRAN uplink carrier channel bandwidth in an UTRAN access point. The reference point for the RSSI measurements shall be the antenna connector on the UTRAN access point cabinet.
<b>Purpose</b>	Load control (UTRAN uplink carrier), initial power setting of uplink physical channels (UTRAN uplink carrier).
<b>Range/mapping</b>	TBD.

## 6.2.2 SIR

<b>Definition</b>	Signal to Interference Ratio, is defined as the RSCP divided by the ISCP. <u>Measurement shall be performed on the DPCCH after RL combination in Node B.</u> The reference point for the SIR measurements shall be the antenna connector on the UTRAN access point cabinet.
<b>Purpose</b>	Power control (DPCCH), macro diversity evaluation (DPCCH).
<b>Range/mapping</b>	TBD.

## 6.2.3 Total Transmitted Power

<b>Definition</b>	Total Transmitted Power, is the total transmitted power on one carrier from one UTRAN access point. <u>Measurement shall be possible on any carrier transmitted from the UTRAN access point.</u> The reference point for the total transmitted power measurement shall be the antenna connector at the UTRAN access point cabinet.
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<b>Purpose</b>	Load control (any carrier transmitted from an UTRAN access point).
<b>Range/mapping</b>	TBD.

## 6.2.4 Transmitted Code Power

<b>Definition</b>	Transmitted Code Power, is the transmitted power on one carrier and one channelisation code. <u>Measurement shall be possible on any channelisation code transmitted from the UTRAN access point.</u> The reference point for the transmitted code power measurement shall be the antenna connector at the UTRAN access point cabinet.
<b>Purpose</b>	<del>Power balancing between different radio links (any channelisation code transmitted from an UTRAN access point).</del>
<b>Range/mapping</b>	TBD.

## 6.2.5 Transport CH BLER

<b>Definition</b>	Estimation of the transport channel block error rate (BLER). The BLER estimation shall be based on evaluating the CRC on each transport block. <u>Measurement shall be performed on transport channel DPCH carried by physical channel DPCH after RL combination in Node B.</u>
<b>Purpose</b>	<del>Handover evaluation (transport channel DCH), outer loop power control (transport channel DCH).</del>
<b>Range/mapping</b>	TBD.

## 6.2.6 Physical CH BER

<b>Definition</b>	The physical channel BER is an estimation of the average bit error rate (BER) before channel decoding of the data. <u>Measurement shall be performed on transport channel DCH carried by physical channel DPDCH after RL combination in Node B</u>
<b>Purpose</b>	<del>Macrodiversity combining (DPDCH), outer loop power control (DPDCH).</del>
<b>Range/mapping</b>	TBD.

## 6.2.7 Round Trip Delay (RTD)

**Note: The relation between this measurement and the TOA measurement defined by WG2 needs clarification.**

<b>Definition</b>	<p>Round Trip Delay (RTD), is defined as</p> $RTD = T_{RX} - T_{TX}, \text{ where}$ <p><math>T_{TX}</math> = The time of transmission of the beginning of a downlink DPCH frame to a UE.</p> <p><math>T_{RX}</math> = The time of reception of the beginning (the first significant path) of the corresponding uplink DPCCCH/DPDCH frame from the UE.</p> <p>Note: The definition of "first significant path" needs further elaboration.</p> <p><u>Measurement shall be possible on DPCH for each RL transmitted from an UTRAN access point and DPDCH/DPCCCH for each RL received in an UTRAN access point.</u></p>
<b>Purpose</b>	<del>Estimation of the path delay and the distance between a UTRAN access point and the UE (DPCH, DPDCH/DPCCCH).</del>
<b>Range/mapping</b>	TBD.

## ~~8 Removal of paragraphs from the original TS 25.231 v0.3.1~~

The following paragraphs in the original 25.321 v0.3.1 have been deleted or moved to another section.

<b>Paragraph</b>	<b>Comment</b>
5.1	Heading 5.1 replaced by heading 5.1.1 in this new structure. Some of the editor text between section 5.1 to 5.1.1 removed.
5.1.1	Moved to 7.1.1.1, minor editorial changes (e.g. to wrong references).
5.1.2	Measurement abilities defined in section 6.
5.2	Heading 5.2 replaced by heading 7.1.1 in this new structure.
5.2.1	Moved to 7.1.1.1, minor editorial changes (e.g. to wrong references).
5.2.2	Measurement abilities defined in section 6.
6	Measurements at call set up, DCA measurements, TDD only, removed.
7.1	Heading 7.1 replaced by heading 7.1.1.2 in this new structure.
7.1.2	Removed. Not a WG1 issue.
7.1.3	Heading removed.
7.1.3.1	Removed, empty section.
7.1.3.2	Partly removed, this section also contained what to measure for handover, the measurements are now described in section 6.
7.1.3.3	Heading 7.1.3.3 replaced by heading 7.1.3 in this new structure.
7.1.3.3.1	Moved into section Compressed mode, 7.1.2
7.1.3.3.2	Moved into section Compressed mode, 7.1.2
7.1.3.3.3	Measurement requirements handled by WG4.
7.1.3.3.4.2	Measurement abilities defined in section 6.
7.1.3.3.5.2	Measurement abilities defined in section 6.
7.1.4	Measurements for the Handover preparation in FDD at the UTRAN side (empty section), removed.

<b>Paragraph</b>	<b>Comment</b>
	measurement quantities handled in section 6.
7.1.5	TDD section
7.1.6	TDD section
7.1.7	TDD section
7.2	Measurement for cell reselection in active mode <sup>2</sup> , section not needed, editor's note deleted, contents (one descriptive sentence) moved to 7.1.1.1
7.3	Measurement for power control <sup>1</sup> was interpreted as power control measurements reported over the radio; empty section, deleted.
7.4	TDD section
7.5	Measurements on adjacent channels, removed, not needed?
7.6	Measurements for radio link time out (or sync loss) deleted.
8	Radio Link Measurement section not needed. Measurement quantities are defined in section 6 instead.
Annex 1	Handover scenarios. Completely removed, not an WG1 issue.
Annex 2	Handover execution. Completely removed.