

# 3GPP TS 36.101 V8.2.0 (2008-05)

---

*Technical Specification*

**3rd Generation Partnership Project;  
Technical Specification Group Radio Access Network;  
Evolved Universal Terrestrial Radio Access (E-UTRA);  
User Equipment (UE) radio transmission and reception  
(Release 8)**



The present document has been developed within the 3<sup>rd</sup> Generation Partnership Project (3GPP<sup>TM</sup>) and may be further elaborated for the purposes of 3GPP.

The present document has not been subject to any approval process by the 3GPP Organizational Partners and shall not be implemented.

This Specification is provided for future development work within 3GPP only. The Organizational Partners accept no liability for any use of this Specification.

---

Keywords

UMTS, BSS, radio

**3GPP**

---

Postal address

---

3GPP support office address

650 Route des Lucioles - Sophia Antipolis  
Valbonne - FRANCE  
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

---

Internet

<http://www.3gpp.org>

---

**Copyright Notification**

No part may be reproduced except as authorized by written permission.  
The copyright and the foregoing restriction extend to reproduction in all media.

© 2008, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TTA, TTC).  
All rights reserved.

# Contents

Foreword .....	7
1 Scope .....	8
2 References .....	8
3 Definitions, symbols and abbreviations .....	8
3.1 Definitions .....	8
3.2 Symbols .....	9
3.3 Abbreviations .....	9
4 General .....	10
4.1 Relationship between minimum requirements and test requirements .....	10
4.2 Applicability of minimum requirements .....	10
5 Frequency bands and channel arrangement .....	10
5.1 General .....	10
5.2 Frequency bands .....	10
5.3 TX–RX frequency separation .....	11
5.4 Channel arrangement .....	11
5.4.1 Channel spacing .....	11
5.4.2 Channel bandwidth .....	11
5.4.2.1 Nominal channel bandwidth .....	12
5.4.2.2 Additional channel bandwidth .....	13
5.4.3 Channel raster .....	14
5.4.4 Carrier frequency and EARFCN .....	14
5.4.5 Void .....	15
6 Transmitter characteristics .....	16
6.1 General .....	16
6.2 Transmit power .....	16
6.2.1 Void .....	16
6.2.2 UE Maximum Output Power .....	16
6.2.3 UE Maximum Output power for modulation / channel bandwidth .....	16
6.3 Output power dynamics .....	18
6.3.1 Power control .....	18
6.3.2 Minimum output power .....	18
6.3.2.1 Minimum requirement .....	18
6.3.3 Transmit ON/OFF power .....	18
6.3.3.1 Transmit OFF power .....	18
6.3.3.1.1 Minimum requirement .....	18
6.4 Control and monitoring functions .....	18
6.4.1 Out-of-synchronization handling of output power .....	18
6.5 Transmit signal quality .....	18
6.5.1 Frequency error .....	18
6.5.2 Transmit modulation .....	18
6.5.2.1 Error Vector Magnitude .....	18
6.5.2.1.1 Minimum requirement .....	19
6.5.2.2 IQ-component .....	19
6.5.2.2.1 Minimum requirements .....	19
6.5.2.3 In-band emissions .....	19
6.5.2.3.1 Minimum requirements .....	19
6.6 Output RF spectrum emissions .....	20
6.6.1 Occupied bandwidth .....	20
6.6.2 Out of band emission .....	21
6.6.2.1 Spectrum emission mask .....	21
6.6.2.1.1 Minimum requirement .....	21
6.6.2.2 Additional Spectrum Emission Mask .....	21
6.6.2.2.1 Minimum requirement (network signalled value "NS_03") .....	21

6.6.2.2.2	Minimum requirement (network signalled value "NS_04").....	22
6.6.2.2.3	Minimum requirement (network signalled value "NS_06").....	22
6.6.2.3	Adjacent Channel Leakage Ratio.....	23
6.6.2.3.1	Minimum requirement E-UTRA.....	23
6.6.2.3.2	Minimum requirements UTRA.....	24
6.6.2.4	Additional ACLR requirements.....	24
6.6.2.4.1	Minimum requirements (network signalled value "NS_02").....	24
6.6.3	Spurious emissions.....	24
6.6.3.1	Minimum requirements.....	24
6.6.3.2	Spurious emission band UE co-existence.....	25
6.6.3.3	Additional spurious emissions.....	29
6.6.3.3.1	Minimum requirement (network signalled value "NS_05").....	29
6.7	Transmit intermodulation.....	29
7	Receiver characteristics.....	30
7.1	General.....	30
7.2	Diversity characteristics.....	30
7.3	Reference sensitivity power level.....	30
7.3.1	Minimum requirements (QPSK).....	30
7.4	Maximum input level.....	33
7.4.1	Minimum requirements.....	33
7.5	Adjacent Channel Selectivity (ACS).....	34
7.5.1	Minimum requirements.....	34
7.6	Blocking characteristics.....	35
7.6.1	In-band blocking.....	35
7.6.1.1	Minimum requirements.....	35
7.6.2	Out of-band blocking.....	36
7.6.2.1	Minimum requirements.....	36
7.6.3	Narrow band blocking.....	37
7.6.3.1	Minimum requirements.....	37
7.7	Spurious response.....	38
7.7.1	Minimum requirements.....	38
7.8	Intermodulation characteristics.....	38
7.8.1	Wide band intermodulation.....	38
7.8.1.1	Minimum requirements.....	38
7.8.2	Narrow band intermodulation.....	39
7.8.2.1	Minimum requirements.....	39
7.9	Spurious emissions.....	39
7.9.1	Minimum requirements.....	39
8.1	General.....	40
8.1.1	Dual-antenna receiver capability.....	40
8.1.1.1	Simultaneous unicast and MBMS operations.....	40
8.1.1.2	Dual-antenna receiver capability in idle mode.....	40
8.2	Demodulation of PDSCH (Cell-Specific Reference Symbols).....	40
8.2.1	FDD (Fixed Reference Channel).....	40
8.2.1.1	Single-antenna port performance.....	40
8.2.1.1.1	Minimum Requirement QPSK.....	40
8.2.1.1.2	Minimum Requirement 16QAM.....	41
8.2.1.1.3	Minimum Requirement 64QAM.....	41
8.2.1.2	Transmit diversity performance.....	43
8.2.1.3	Open-loop spatial multiplexing performance.....	43
8.2.1.4	Closed-loop spatial multiplexing performance.....	43
8.2.1.5	MU-MIMO.....	43
8.2.1.6	[Control channel performance: D-BCH and PCH].....	43
8.2.2	DL-SCH TDD (Fixed Reference Channel).....	43
8.2.1.1	Single-antenna port performance.....	43
8.2.1.2	Transmit diversity performance.....	43
8.2.1.3	Open-loop spatial multiplexing performance.....	43
8.2.1.4	Closed-loop spatial multiplexing performance.....	43
8.2.1.5	MU-MIMO.....	43
8.2.1.6	[Control channel performance: D-BCH and PCH].....	43
8.3	Demodulation of PDSCH (User-Specific Reference Symbols).....	43

8.4.1	FDD .....	43
8.4.1.1	Single-antenna port performance .....	43
8.4.1.2	Transmit diversity performance .....	43
8.4.2	TDD .....	43
8.4.2.1	Single-antenna port performance .....	43
8.4.2.2	Transmit diversity performance .....	43
8.5	Demodulation of PHICH .....	43
8.6	Demodulation of PBCH .....	43
9	Reporting of [CQI/PMI] .....	44
<b>Annex A (normative): Measurement channels .....</b>		<b>45</b>
A.1	General .....	45
A.2	UL reference measurement channels .....	45
A.3	DL reference measurement channels .....	45
A.3.1	General .....	45
A.3.2	Reference measurement channel for receiver characteristics .....	45
A.3.3	Reference measurement channels for PDSCH performance requirements (FDD) .....	47
A.3.3.1	Single-antenna port (Fixed Reference Channel) .....	47
A.3.3.2	Transmit diversity (Fixed Reference Channel) .....	49
A.3.3.3	Spatial Multiplexing (Fixed Reference Channel) .....	49
A.3.4	Reference measurement channels for PDSCH performance requirements (TDD) .....	49
A.3.4.1	Single-antenna port (Fixed Reference Channel) .....	49
A.3.4.2	Transmit diversity (Fixed Reference Channel) .....	50
A.3.4.3	Spatial multiplexing (Fixed Reference Channel) .....	50
<b>Annex B (normative): Propagation conditions .....</b>		<b>51</b>
B.1	Static propagation condition .....	51
B.2	Multi-path fading propagation conditions .....	51
B.2.1	Delay profiles .....	51
B.2.2	Combinations of channel model parameters .....	52
B.2.3	Multi-Antenna channel models .....	52
B.2.3	Correlation Matrix Definitions .....	53
B.3	High speed train scenario .....	54
<b>Annex C (normative): Downlink Physical Channels .....</b>		<b>56</b>
C.1	General .....	56
C.2	Set-up .....	56
C.3	Connection .....	56
C.3.1	Measurement of Receiver Characteristics .....	56
C.3.2	Measurement of Performance requirements .....	57
<b>Annex D (normative): Characteristics of the interfering signal .....</b>		<b>58</b>
D.1	General .....	58
D.2	Interference signals .....	58
<b>Annex E (normative): Environmental conditions .....</b>		<b>59</b>
E.1	General .....	59
E.2	Environmental .....	59
E.2.1	Temperature .....	59
E.2.2	Voltage .....	59
E.2.3	Vibration .....	60

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.