# 3GPP TS 36.101 V11.0.0 (2012-03)

**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 11)





The present document has been developed within the 3rd Generation Partnership Project (3GPP TM) 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.

Find authenticated court documents without watermarks at docketalarm.com.

DOCKE

Δ

RM

Δ

Keywords 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.

© 2012, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TTA, TTC). All rights reserved.

UMTS<sup>TM</sup> is a Trade Mark of ETSI registered for the benefit of its members 3GPP<sup>TM</sup> is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners LTE<sup>TM</sup> is a Trade Mark of ETSI currently being registered for the benefit of its Members and of the 3GPP Organizational Partners GSM® and the GSM logo are registered and owned by the GSM Association

Find authenticated court documents without watermarks at docketalarm.com.

# Contents

| Foreword        |   |    |
|-----------------|---|----|
| 1               | Scope   | 14 |
| 2               | References  | 14 |
| 3<br>3.1        | Definitions, symbols and abbreviations<br>Definitions   |    |
| 3.2             | Symbols   |    |
| 3.3             | Abbreviations   |    |
| 4               | General   |    |
| 4.1             | Relationship between minimum requirements and test requirements                                     |    |
| 4.2             | Applicability of minimum requirements   |    |
| 4.3             | Void  |    |
| 4.3A            | Applicability of minimum requirements (CA, UL-MIMO, eDL-MIMO)                                       |    |
| 4.4             | RF requirements in later releases   |    |
| 5               | Operating bands and channel arrangement   | 19 |
| 5.1             | General   | 19 |
| 5.2             | Void  | 19 |
| 5.3             | Void  |    |
| 5.4             | Void  |    |
| 5.5             | Operating bands   |    |
| 5.5A            | Operating bands for CA  |    |
| 5.5B            | Operating bands for UL-MIMO   |    |
| 5.6<br>5.6.1    | Channel bandwidth<br>Channel bandwidths per operating band  |    |
| 5.6A            | Channel bandwidth for CA  |    |
| 5.6A.1          |   |    |
| 5.6B            | Channel bandwidth for UL-MIMO.  |    |
| 5.6B.1          |   |    |
| 5.7             | Channel arrangement   |    |
| 5.7.1           | Channel spacing   |    |
| 5.7.1A          | A Channel spacing for CA  |    |
| 5.7.2           | Channel raster  |    |
| 5.7.2A          |   |    |
| 5.7.3           | Carrier frequency and EARFCN  |    |
| 5.7.4           | TX-RX frequency separation  |    |
| 5.7.4A          | A TX-RX frequency separation for CA   |    |
| 6               | Transmitter characteristics   | 28 |
| 6.1             | General   |    |
| 6.2             | Transmit power  |    |
| 6.2.1           | Void  | -  |
| 6.2.2           | UE maximum output power   |    |
| 6.2.2A          |   |    |
| 6.2.2E<br>6.2.3 | 3 UE maximum output power for UL-MIMO<br>UE maximum output power for modulation / channel bandwidth |    |
| 6.2.3A          |   |    |
| 6.2.3F          |   |    |
| 6.2.4           | UE maximum output power with additional requirements  |    |
| 6.2.4A          |   |    |
| 6.2.4A          |   |    |
| 6.2.4A          | A.2 A-MPR for CA_NS_02 for CA_1C  | 38 |
| 6.2.4A          | A.3 A-MPR for CA_NS_03 for CA_1C  | 38 |
| 6.2.4A          | A.4 A-MPR for CA_NS_04  | 38 |
| 6.2.4E          |   |    |
| 6.2.5           | Configured transmitted power  |    |

| 6.2.5A            | Configured transmitted power for CA                      | 40   |
|-------------------|--|------|
| 6.2.5B            | Configured transmitted power for UL-MIMO                 |      |
| 6.3               | Output power dynamics                                    |      |
| 6.3.1             | (Void)   |      |
| 6.3.2             | Minimum output power                                     |      |
| 6.3.2.1           | Minimum requirement                                      |      |
| 6.3.2A            | UE Minimum output power for CA                           | 44   |
| 6.3.2A.1          | Minimum requirement for CA                               |      |
| 6.3.2B            | UE Minimum output power for UL-MIMO                      |      |
| 6.3.2B.1          | Minimum requirement                                      |      |
| 6.3.3             | Transmit OFF power                                       |      |
| 6.3.3.1.          | Minimum requirement                                      |      |
| 6.3.3A            | UE Transmit OFF power for CA                             |      |
| 6.3.3A.1          | Minimum requirement for CA.                              |      |
| 6.3.3B            | UE Transmit OFF power for UL-MIMO                        |      |
| 6.3.3B.1          | Minimum requirement.                                     |      |
| 6.3.4             | ON/OFF time mask   |      |
| 6.3.4.1           | General ON/OFF time mask                                 |      |
| 6.3.4.2           | PRACH and SRS time mask                                  |      |
| 6.3.4.2.1         | PRACH time mask  |      |
| 6.3.4.2.2         | SRS time mask  |      |
| 6.3.4.3           | Slot / Sub frame boundary time mask                      |      |
|                   |  |      |
| 6.3.4.4<br>6.3.4A | PUCCH / PUSCH / SRS time mask<br>ON/OFF time mask for CA | 49   |
| 0.0               |  |      |
| 6.3.4B            | ON/OFF time mask for UL-MIMO                             |      |
| 6.3.5             | Power Control  |      |
| 6.3.5.1           | Absolute power tolerance                                 |      |
| 6.3.5.1.1         | Minimum requirements                                     |      |
| 6.3.5.2           | Relative Power tolerance                                 |      |
| 6.3.5.2.1         | Minimum requirements                                     |      |
| 6.3.5.3           | Aggregate power control tolerance                        |      |
| 6.3.5.3.1         | Minimum requirement                                      |      |
| 6.3.5A            | Power control for CA                                     |      |
| 6.3.5A.1          | Absolute power tolerance                                 |      |
| 6.3.5A.1.         | $\mathbf{I}$   |      |
| 6.3.5A.2          | Relative power tolerance                                 |      |
| 6.3.5A.2.         | <b>1</b>   |      |
| 6.3.5A.3          | Aggregate power control tolerance                        |      |
| 6.3.5A.3.         |  | 53   |
| 6.3.5B            | Power control for UL-MIMO                                |      |
| 6.4               | Void   |      |
| 6.5               | Transmit signal quality                                  | 53   |
| 6.5.1             | Frequency error  |      |
| 6.5.1A            | Frequency error for CA                                   | 54   |
| 6.5.1B            | Frequency error for UL-MIMO                              | 54   |
| 6.5.2             | Transmit modulation quality                              | 54   |
| 6.5.2.1           | Error Vector Magnitude                                   | 54   |
| 6.5.2.1.1         | Minimum requirement                                      | 54   |
| 6.5.2.2           | Carrier leakage  | 55   |
| 6.5.2.2.1         | Minimum requirements                                     | 55   |
| 6.5.2.3           | In-band emissions  | . 55 |
| 6.5.2.3.1         | Minimum requirements                                     | 55   |
| 6.5.2.4           | EVM equalizer spectrum flatness                          |      |
| 6.5.2.4.1         | Minimum requirements                                     |      |
| 6.5.2A            | Transmit modulation quality for CA                       |      |
| 6.5.2A.1          | Error Vector Magnitude                                   |      |
| 6.5.2A.2          | Void   |      |
| 6.5.2A.3          | In-band emissions  |      |
| 6.5.2A.3.         |  |      |
| 6.5.2B            | Transmit modulation quality for UL-MIMO                  |      |
| 6.5.2B.1          | Error Vector Magnitude                                   |      |
|                   | -  |      |

DOCKET ALARM Find authenticated court documents without watermarks at <u>docketalarm.com</u>.

4

| 6.5.2B.2   | Carrier leakage   |    |
|------------|---|----|
| 6.5.2B.3   | In-band emissions   |    |
| 6.5.2B.4   | EVM equalizer spectrum flatness for UL-MIMO                       |    |
| 6.6        | Output RF spectrum emissions                                      |    |
| 6.6.1      | Occupied bandwidth  |    |
| 6.6.1A     | Occupied bandwidth for CA   |    |
| 6.6.1B     | Occupied bandwidth for UL-MIMO                                    |    |
| 6.6.2      | Out of band emission  |    |
| 6.6.2.1    | Spectrum emission mask  |    |
| 6.6.2.1.1  | Minimum requirement   |    |
| 6.6.2.1A   | Spectrum emission mask for CA                                     |    |
| 6.6.2.2    | Additional spectrum emission mask                                 |    |
| 6.6.2.2.1  | Minimum requirement (network signalled value "NS_03" and "NS_11") |    |
| 6.6.2.2.2  | Minimum requirement (network signalled value "NS 04")             |    |
| 6.6.2.2.3  | Minimum requirement (network signalled value "NS_06" or "NS_07")  |    |
| 6.6.2.2A   | Additional Spectrum Emission Mask for CA                          | 63 |
| 6.6.2.2A.  |   |    |
| 6.6.2.3    | Adjacent Channel Leakage Ratio                                    |    |
| 6.6.2.3.1  | Minimum requirement E-UTRA  |    |
| 6.6.2.3.1A |   |    |
| 6.6.2.3.2  | Minimum requirements UTRA   |    |
| 6.6.2.3.2A | 1   |    |
| 6.6.2.3.3A |   |    |
| 6.6.2.4    | Void  | 66 |
| 6.6.2.4.1  | Void  |    |
| 6.6.2A     | Void  |    |
| 6.6.2B     | Out of band emission for UL-MIMO                                  |    |
| 6.6.3      | Spurious emissions  |    |
| 6.6.3.1    | Minimum requirements  |    |
| 6.6.3.1A   | Minimum requirements for CA                                       |    |
| 6.6.3.2    | Spurious emission band UE co-existence                            |    |
| 6.6.3.2A   | Spurious emission band UE co-existence for CA                     | 71 |
| 6.6.3.3    | Additional spurious emissions                                     | 72 |
| 6.6.3.3.1  | Minimum requirement (network signalled value "NS 05")             |    |
| 6.6.3.3.2  | Minimum requirement (network signalled value 'NS_05')             |    |
| 6.6.3.3.3  | Minimum requirement (network signalled value 'NS_07')             |    |
| 6.6.3.3.4  | Minimum requirement (network signalled value 'NS_00')             |    |
| 6.6.3.3.5  | Minimum requirement (network signalled value 'NS_12'')            |    |
| 6.6.3.3.6  | Minimum requirement (network signalled value 'NS 13'')            |    |
| 6.6.3.3.7  | Minimum requirement (network signalled value 'NS_14'')            | 74 |
| 6.6.3.3.8  | Minimum requirement (network signalled value 'NS_17')             |    |
| 6.6.3.3A   | Additional spurious emissions for CA.                             | 75 |
| 6.6.3.3A.  |   | 75 |
| 6.6.3.3A.2 |   | 75 |
| 6.6.3.3A.3 |   | 76 |
| 6.6.3A     | Void.   |    |
| 6.6.3B     | Spurious emission for UL-MIMO                                     |    |
| 6.6A       | Void  |    |
| 6.6B       | Void  |    |
| 6.7        | Transmit intermodulation  |    |
| 6.7.1      | Minimum requirement   |    |
| 6.7.1A     | Minimum requirement for CA  |    |
| 6.7.1B     | Minimum requirement for UL-MIMO                                   |    |
| 6.8        | Time alignment between transmitter branches for UL-MIMO           |    |
| 6.8.1      | Minimum Requirements.   |    |
|            | -   |    |
| 7 Re       | ceiver characteristics  | 78 |
| 7.1        | General   |    |
| 7.2        | Diversity characteristics   |    |
| 7.3        | Reference sensitivity power level                                 |    |
| 7.3.1      | Minimum requirements (QPSK)                                       |    |
| 7.3.1A     | Minimum requirements (QPSK) for CA                                |    |

**DOCKET** A L A R M Find authenticated court documents without watermarks at <u>docketalarm.com</u>.

# DOCKET A L A R M



# 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.