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3RD GENERATION
PARTNERSHIP
PROJECT 2
"3GPP2"

10 Evolution of Ultra Mobile Broadband

11 12 *System Requirements Document*

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6 **REVISION HISTORY**

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1 **1 INTRODUCTION AND SCOPE**

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3 This System Requirements Document SRD aims to outline the
4 requirments to strengthen and broaden the capabilities of radio
5 transmisison technologies and associated network capabilities and
6 services of Ultra Mobile Broadband. It is expected that the wireless
7 telecommunication systems will further evolve in the upcoming decade,
8 continuing on the path of techological innovation, fostering new services
9 and capabilities. Increased efficiency and flexibility in setting up and
10 operating wireless networks is expected to enable ease of deployment and
11 operation from operator’s perspective. By the same token, these
12 enhancments are aimed at making services easier to use and better in
13 performance from user’s perspective.

14 The intent of this document is to outline the appropriate requirements,
15 which will govern the development of radio interface and IOS
16 specifications to address likely improved performance goals, and more
17 flexible deployment models (meshed network topologies, mix of macro,
18 pico, and femto cells).

19

20 **2 REFERENCES**

21 Unless explicitly stated in the reference, references are to the latest
22 revision, addendum, version, or date. The document references which
23 are applicable to this specification include the following:

24

- 25 [1] C.S0084-000~009-0, “Ultra Mobile Broadband (UMB) Air Interface
26 Specification”

27

28

29 **3 DEFINITIONS AND ABBREVIATIONS**

30 The terms and abbreviations which are used within this specification are
31 defined as follows:

32

33

Abbreviation/Term	Description
AP	Access Point
AT	Access Terminal

BCMCS	Broadcast/Multicast Services
HDP	Highly Detectable Pilots
HRPD	High Rate Packet Data
IOS	Inter-Operability System
UMB	Ultra Mobile Broadband
MAC	Medium Access Control
RS	Relay Station

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4 **4 GENERAL FEATURE DESCRIPTION**

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6 The goals for UMB Evolution include several improvements and novelties,
7 including:

8

- Higher data rates

9

- Improved spectral efficiency

10

- New deployment models, for example: Plug & Play, Relays, Macro-Pico Cell (Public) and Femto Cell (Private) Coexistence, and other scenarios

11

12

13

- New radio link topologies

14

- Utility enhancements, for example, positioning and Local BCMCS

15

16 The objectives for these improvements are to meet the operator and user needs in the coming decade.

17

18 Current multiple-carrier support in UMB extends peak data rate at
19 higher bandwidth. Other techniques can be employed to further increase
20 spectral efficiency, peak rates, and enhance user experience throughout the system.

18

19

20

21

22 New deployment models are another area that might be enhanced by
23 Enhanced UMB. These include Macro-Pico (Public) and Femto (Private) cell coexistence.

22

23

24

25 Other enhancements enabled by higher data rates and new topologies are feasible.

25

1 Evolution of broadband wireless is about providing ubiquitous wireline-
2 like user experience in an effective and efficient way, which means
3 seamless and ubiquitous broadband coverage.

4

5 **5 DETAILED REQUIREMENTS**

6

7 **5.1 Deployment and Operation**

8 The intent of UMB enhancements is to further optimize Plug-and-Play
9 quality of system deployment.

10

11 **UMBA-01:** Dense deployments of enhanced UMB access points (such as
12 those for femto and pico cells) should:

- 13 • Be autonomously adaptable to topology, interference and RF
14 propagation environment;
- 15 • Have reduced complexity with easy-to-install Micro, Pico, and
16 Femto cells, as needed, or autonomously driven by demand (e.g.
17 femto cell installation in people's homes autonomously provisions
18 coverage and capacity where it is most needed)

19

20 **UMBA-02:** Enhanced UMB femto cells shall be capable of core network
21 discovery and self-configuration of radio and other parameters.

22 **UMBA-03:** Enhanced UMB femto cells shall support restricted access to
23 only specific sets of authorized ATs (e.g. deployed at home or private
24 enterprise).

25 **UMBA-04:** Enhanced UMB shall allow operation over co-existing public
26 and private infrastructure, e.g., publically accessible (open access) pico
27 cell in proximity of a restricted access femto cell.

28

1 **5.2 Radio Environment and Mobility**

2 **UMBA-05:** Enhanced UMB, as well as other radio interfaces developed
3 by 3GPP2 (e.g., HRPD), shall support heterogeneous infrastructure
4 consisting of macro cells, alongside micro, pico, and femto cells with
5 progressively lower transmit power.

6 **UMBA-06:** Enhanced UMB should support adaptive interference
7 management for efficient dense deployments.

8 **UMBA-07:** Enhanced UMB system shall support mesh networking.

9 Note 1: In mesh networks, any AP can become Relay Station (RS).
10 Access and backhaul may use the very same frequency, but other
11 arrangements are feasible, including cross-band (using one band for
12 radio access, and another band for backhaul). The background of this
13 requirement is overall spectral and system efficiency, and ease of
14 operation/deployment, which may be enhanced by meshing and RS
15 support.

16 Note 2: Support for mesh networking is required in the standards, but
17 optional for deployment.

18

19 **UMBA-08:** Enhanced UMB Physical and MAC layers should support
20 upper layer protocol simplifications (e.g. RLP etc.) for highly optimized,
21 extremely high user data rates.

22

23 **5.3 Services**

24 **UMBA-09:** Enhanced UMB should support enhancements for position
25 location (e.g., improved reliability and accuracy of position fixes; such
26 as HDP or other methods; any potential service architecture
27 improvements that make the service more efficient)

28 **UMBA-10:** Enhanced UMB should support BCMCS enhancements (e.g.,
29 enhancements designed to better support existing or proposed public
30 warning systems; BCMCS with more narrowly defined geographical
31 targeting of broadcast/multicast contents).

32