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System Requirements for MSC Pool

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6 **REVISION HISTORY**

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REVISION HISTORY		
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Version 2.0	<i>Version update to support Legacy CS in addition to LMSD architecture.</i>	<i>05 November 2009</i>

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1 INTRODUCTION AND SCOPE

This document specifies the requirements necessary to support MSC Pool in the CDMA2000^{®1} wireless network. MSC Pool enables signaling connections between one BSC with multiple MSCs, so the MS served by any BSC of that pool area can be served by any MSC in that pool area.

The Serving Node Selection Function (SNSF) is the key functionality for the MSC Pool application. The main function of SNSF is selecting a serving MSC within the MSC Pool for a given user, and routing the signaling between the MSC and the BSC.

2 REFERENCES

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

2.1 Normative Reference

- [1.] 3GPP2 N.S0005-0 v1.0, X.S0004-E v1.0, “Radiotelecommunications intersystem Operations”, July 1997
- [2.] 3GPP2: A.S0011~14-D v1.0, Interoperability Specification (IOS) for cdma2000 Access Network Interfaces, July 2007.

2.2 Informative References

None.

3 DEFINITIONS AND ABBREVIATIONS

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

MSC Pool: An MSC Pool is a set of MSCs or a set of MSCes to which a set of BSCs can connect. An MSC Pool cannot contain a mixture of MSCs and MSCes.

¹ cdma2000[®] is the trademark for the technical nomenclature for certain specifications and standards of the Organizational Partners (OPs) of 3GPP2. Geographically (and as of the date of publication), cdma2000[®] is a registered trademark of the Telecommunications Industry Association (TIA-USA) in the United States

1 Pool Area: A Pool Area is a geographical area which consists of radio
 2 coverage of a set of BSCs connected to an MSC pool. Within the Pool area,
 3 an MS does not need to change the serving MSC or MSCe.

4

BSC	Base Station Controller
HRPD	High Rate Packet Data
LMSD	Legacy MS Domain
LAC	Location Area Code
MS	Mobile Station
MSC	Mobile Switching Center
MSCe	Mobile Switching Center Emulator
PA	Pool Area
SNSF	Serving Node Selection Function

5

6 **4 GENERAL FEATURE DESCRIPTION**

7 MSC Pool feature uses per-user signaling connections between a BSC
 8 and any one MSC or MSCe within the MSC pool with the aid of SNSF. An
 9 MSC pool may contain either MSC(s) or MSCe(s), but not both MSC(s)
 10 and MSCe(s), within the same pool. This allows a more flexible network
 11 topology, so if an MSC or MSCe goes out of service, it does not cause an
 12 entire geographic area assigned to that node to be out of service.

13 For an MS which registers in a Pool Area (PA), the SNSF will select a
 14 serving MSC or MSCe. The MS is served by this serving MSC or MSCe as
 15 long as it is within the PA until load redistribution occurs. When load
 16 redistribution is needed (e.g., when an MSC or MSCe is maintained or
 17 upgraded by the operator, is overloaded, or breaks down), the load
 18 associated with the node will be redistributed to other nodes. All SNSFs
 19 in the PA do not assign any load on the MSC or MSCe until it is
 20 recovered. The MSC Pool feature is not intended to be supported
 21 between and amongst multiple operators. For certain operator scenarios,
 22 for the purpose of load re-balance, the re-registration may be required.

23

24 **4.1 Scenarios for MSC Pool**

25 This section gives some scenarios when a network operator will wish to
 26 apply the MSC Pool mechanism.

27

1 Scenario 1: When a Mobile Station (MS) moves within the Pool Area, the
2 serving MSC or MSCe need not change. Hence the signaling traffic of re-
3 registration could be reduced.

4 Scenario 2: The Core network can be expanded easier and can be scaled
5 between the radio network and core network. For example, the operator
6 could expand Core Network capacity by only introducing a new MSC or
7 MSCe without new BSC(s). Additionally, side benefit is load balance.

8 9 **5 DETAILED REQUIREMENTS**

10 The requirements contained in this section may be implemented in a
11 phased manner during the development of the stage 2 and stage 3
12 specifications.

13 **5.1 System Requirements**

14 SYS-01: It shall be possible to connect between SNSF and any MSC or
15 MSCe in the Pool.

16 SYS-02: An MSC or MSCe within the MSC pool shall be able to
17 support both MSC pool configuration and legacy
18 configuration.

19 SYS-03: A BSC within the MSC pool configuration shall be able to
20 support both MSC pool configuration and legacy
21 configuration.

22 SYS-04: SNSF shall be able to select an MSC or MSCe as a serving
23 node for a subscriber within the MSC Pool configuration
24 based on a selection algorithm which includes the load
25 redistribution capability.

26 SYS-05: It shall be possible for the operator to choose the selection
27 algorithm used by SNSFs.

28 SYS-06: An MS shall be served by a selected MSC or MSCe, known as
29 the default MSC/MSCe, for the life of the registration within
30 the PA even if the MS crosses the BSC boundary within the
31 MSC Pool area.

32 SYS-07: It shall be possible to redistribute the MSs from the current
33 serving node/failure node to a new serving node within the
34 MSC pool, a new serving node provides the functions described
35 in SYS-06.

- 1 SYS-08: MSC Pool network entities shall be able to interoperate with
2 non-MSC Pool network entities without any impact on the
3 non-MSC Pool network entities (e.g., trunking group
4 procedures, handoff procedures).
- 5 SYS-09: This feature shall not create any impacts to deployed non-
6 MSC Pool network interfaces or entities that support [1].
- 7 SYS-10: Deployment of this feature shall be possible such that
8 adjacent non-MSC Pool MSCs or MSCes can interoperate with
9 MSC Pool MSCs or MSCes without modification of procedures
10 of the non-MSC Pool entities.
- 11 SYS-11: It shall be possible to deploy this feature in such a way that
12 an HRPD system that spans both the MSC Pool Area and
13 non-MSC Pool Area can operate without modification, and
14 without modification to standard procedures for handoff from
15 HRPD to cdma2000 1x.
- 16 SYS-12: Introduction of MSC pool shall not impact any of the existing
17 Circuit Switched (CS) services supported by current IOS
18 specification[2].
- 19 SYS-13: MSC Pool shall support legacy cdma2000 1x MS.

20

21 **5.2 Operation, Administration, Maintenance and Provisioning** 22 **Requirements**

- 23 OAM&P-01: The OAM&P system shall be able to trigger load redistribution
24 from one MSC/MSCe to other MSC/MSCe(s) in the MSC Pool.
- 25 OAM&P-02: It shall be possible to allow the BSC to be configured with a
26 new SNSF when the current SNSF is unavailable.

27

28 **5.3 System Design Goals**

- 29 GOALS-01: When one MSC or MSCe in an MSC Pool breaks down, the
30 interruption time for users being registered in this node should
31 be minimized. In other words, another MSC or MSCe within
32 the MSC Pool shall take over the communication services (e.g.,
33 call origination, call delivery, etc.) from this node as quickly as
34 possible.
- 35 GOALS-02: The SNSF should consider load balancing when selecting a
36 serving MSC or MSCe.