

**CONTRIBUTION to  
3GPP2 Workshop on 3G Harmonization**

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AGENDA ITEM:	<b>2</b>
TITLE:	Requirements for Interoperability Between Multi-Carrier CDMA and GSM MAP
SOURCE:	3GPP2 Hooks and Extensions Workshop: Requirements and Architecture Ad Hoc Group

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PLACE – DATE: El Segundo, California – 9-10 September 1999

**Abstract:**

This contribution describes requirements for interoperability between a harmonized Global 3G (G3G) Multi-Carrier CDMA and GSM MAP.

**Recommendation:**

The requirements specified in this contribution should be used by both 3GPP and 3GPP2 for their joint definition and development of hooks and extensions to achieve interoperability between Multi-Carrier CDMA and GSM MAP.

**Hooks:**

No specific hooks are discussed in the document.

**Extensions:**

No specific extensions are discussed in the document.

**Issues:**

None

## **I. Introduction**

The Operators Harmonization Group (OHG) has recently agreed to a harmonized Global 3G (G3G) CDMA technical framework. The harmonized G3G CDMA standard consists of three modes:

- Multi Carrier (MC), which includes 1X, 3X, etc.
- Direct Spread (DS),
- Time Division Duplex (TDD).

In the technical framework, specific recommendations have been made on Chip Rate, Pilot Structure and Synchronization Method for these three modes to ensure a harmonization of the two main CDMA based IMT-2000 Radio Transmission Technology (RTT) proposals: Wideband CDMA (WCDMA) and cdma2000.

ITU, SDOs and 3GPPs need to take appropriate actions to implement the OHG recommendation in the desired timeframe. Specifically, the hooks and extensions, as defined in the G3G CDMA framework, need to be specified in detail so that the three radio access modes (MC, DS and TDD) can be adapted to the two core networks (ANSI-41 and GSM MAP). Each combination of the radio access modes and the core networks shall allow customers to have access to the complete suite of services provided by each network type. Meanwhile, changes to ANSI-41 and GSM MAP should be minimized in development of the hooks and extensions.

This contribution describes requirements for interoperability between Multi-Carrier CDMA and GSM MAP. These requirements should be used by both 3GPP and 3GPP2 for their joint definition and development of the hooks and extensions so that the MC CDMA air interface can support all features and functions provided by the evolved GSM MAP core network. The requirements for interoperability between the Direct Spread CDMA and ANSI-41 have been specified by OHG in a contribution to the 3GPP workshop on UTRA L123 hooks and extensions held in Sophia Antipolis from 24 to 26 August, 1999.

## **II. Requirements**

A combined MC/GSM MAP network should support the Basic, Extended, and Evolutionary Requirements as defined in sections below.

### **II.1 Basic Requirements**

1. The MC radio access network shall be able to interface with GSM-MAP core network.
2. GSM MAP and evolved GSM MAP services (teleservices, bearer services, supplementary services, etc.)

3. GPRS services.
4. Mobile IP services, including WAP.
5. CAMEL services.
6. Technical capabilities for seamless national, regional and global roaming. “Seamless roaming” is defined as the capability for call origination and call delivery that is from the user’s prospective no different than when in the home network. The roaming mobile shall be capable of autonomously registering on the visited network in accordance to the preferred roaming list contained in the UIM, and subsequent to successful completion of authentication procedures, have uninterrupted access to services that it is subscribed to, if offered by the visited network.
7. Seamless handoff from the MC mode to the DS mode and vice versa. “Seamless handoff” is defined as technical capability to perform inter-mode handoff with the success rate that is not appreciably lower than the hard handoff within the native radio interface mode.
8. Seamless handoff from MC/MAP to GSM/MAP systems. Please see the definition of “seamless handoff” in item 7.
9. Intra-network Tandem Free Operation (TFO) within the MC mode, between the MC and DS modes, and MC and TDD modes.
10. Simultaneous/non-simultaneous voice, text, image and video services with guaranteed QoS.
11. SIM/USIM functionality.
12. Existing/evolved security and authentication capability.
13. Evolved Value Added Services (VAS) including location services.
14. Band-independent operation.

## **II.2 Extended Requirements**

“Extended Requirements” means that the best effort will be made to achieve in Release 1999, and is a firm requirement for Release 2000.

1. The seamless handoff from GSM/MAP to MC/MAP. Please see the definition of “seamless handoff” in item 7, section II.1

2. Inter-network Tandem Free Operation (TFO) within the MC mode, between the MC and DS modes, and MC and TDD modes.
3. Extensive voice and non-voice service options/service negotiation capability, including:
  - EVRC and AMR
  - Video Internet formats in most common use today for streaming and real-time video.
  - Music Internet format in most common use today.
  - Voice service option negotiation capability during call setup and while call is in progress.
  - Maximum vocoder data rate negotiation capability for the purpose of congestion control and QoS subscription (willingness to pay).
  - Packet data QoS (delay tolerance, loss rate) negotiation capability at call setup, independently for each link.
  - Packet data maximum rate negotiation capability at call set-up for each link independently. Data rate control capability at any time during packet session.

Note : See Notes 1 and 2 under item 8 above for extending the concept of common video and music codecs to all G3G modes and unified wireline/wireless networks.

## **II.1 Evolutionary Requirements**

1. Globally common vocoder for the G3G system. Common vocoder for G3G systems would support Tandem Free Operation (TFO) within the MC mode, between the MC and DS modes, and MC and TDD modes. It would also have a tendency to reduce the number of vocoders required to be supported by the mobile station for global roaming. This requirement translates into the requirement to embark upon the development of a common vocoder for the G3G system.

Note 1: The requirement for commonality of vocoders, expressed here in the context of Multi-Carrier support on GSM MAP, by definition extends to all modes, including native modes and DS supported on ANSI-41.

Note 2: TFO requirement should be also extended to interoperation with wireline networks, to the extent possible, with integrated VoIP based networks as a unifying factor.

2. Extensive voice and non-voice service options/service negotiation capability, including:
  - Yet-to-be-defined global CDMA vocoder with variable data rate and maximum data rate control capabilities.

- Future yet-to-be-defined CDMA specific format for video with pixel dimension control, color palette control, refresh rate control, variable data rate and maximum data rate control capability. It is a strong requirement to embark upon a common G3G video codec development.
- Future yet-to-be-defined CDMA specific format for music with variable rate and maximum data rate control capability.
- Video codec service option negotiation capability. For the CDMA specific video format, ability to negotiate pixel dimension, color palette, refresh rate and maximum data rate on each link (forward and reverse) independently.
- Music codec service option negotiation capability. For the CDMA specific audio format, ability to negotiate maximum data rate.

Note : See Notes 1 and 2 under item 1 above for extending the concept of common video and music codecs to all G3G modes and unified wireline/wireless networks.

### **III. Summary**

The above should be considered as high level requirements for MC-MAP interoperability. We believe that MC/GSM MAP will be an important combination of radio access and core network, which will be deployed in various regions of the world. Contributors are willing to work with other services providers, manufacturers, SDOs, and 3GPPs to develop more detailed requirements so that the desired interoperability between MC CDMA and GSM MAP can be achieved.