Mobile Codes Requirements

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Open Mobile Alliance

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1. Scope (Informative)

OMA Mobile Codes Enabler aims to stimulate, by the creation of a standard, a global market in which barcodes act as enablers for camera-equipped devices* to access content and services. Some technologies already exist; for example, in Japan, 2D barcode scanning is in widespread use. However, there is fragmentation in the worldwide market currently due to the variety of approaches as to which barcode Symbologies should be supported, what format of data they should contain, and how client software should behave when barcodes are read. The Open Mobile Alliance aims to halt fragmentation by providing a standard by creating specifications to address interoperability needs as they arise. Once enough mobile code clients that follow those specifications are deployed on consumer handsets, marketing organisations and publishers will be able to include mobile codes as links to online content and services with confidence, in advertising and promotional campaigns, and in printed and displayed media of many kinds.

*Note: Devices for the Mobile Codes Enabler (MC Enabler) are intended to be handheld mobile devices (i.e. handsets, PDAs, etc.) used by a human person.

2. References

2.1 Normative References

[RFC2119] "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt

2.2 Informative References

[DATAMATRIX] "Information technology — International symbology specification — Data Matrix", ISO/IEC 16022:2000.

[EAN/UPC] "Information technology — Automatic identification and data capture techniques — Bar code symbology specification — EAN/UPC", ISO/IEC 15420.

[MIME] "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types", RFC 2046 http://www.ietf.org/rfc/rfc2046.txt

[OMADICT] "Dictionary for OMA Specifications", Version 2.8, Open Mobile Alliance™, OMA-ORG-Dictionary-V2_8, URL:http://www.openmobilealliance.org/

[OMAWP] "White Paper on Mobile Codes", Open Mobile Alliance™, OMA-WP-MobileCodes-20081024-A, URL:http://www.openmobilealliance.org/.

[OMAURI] "URI Schemes for the Mobile Applications Environment", Version 1.0, Open Mobile Alliance™, OMA-TS-URI_Schemes-V1_0, URL:http://www.openmobilealliance.org/.

[QR] "Information technology — Automatic identification and data capture techniques — QR Code 2005 bar code symbology specification", ISO/IEC 18004:2006.

[URI] "RFC 3986. Uniform Resource Identifier (URI): Generic Syntax", IETF, http://www.ietf.org/rfc/rfc3986.txt.

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

Code Clearing House function	The process of Indirect Code routing based on the Indirect Code Identifier, through which: a) the Resolving CMP is determined, and b) the Indirect Code Identifier is forwarded to the Resolving CMP.
Code Management Platform	The Code Management Platform provides a resolution service pertaining to Indirect Codes; it is normally capable of performing both the Code Clearing House (CCH) function and Code Resolution (CR) and may also interact with other Code Management Platforms, as required. In certain deployment scenarios, the CCH function and the CR function may be implemented in two separate Code Management platforms. (See Split-CMP-Parent and Split-CMP-Child).
Code Resolution (or Code Resolution function)	The process of mapping a Direct Code or an Indirect Code into either content to be consumed directly by the device, or the address of content (or a service) to be accessed by the device. Typically, Code Resolution for Indirect Codes requires access to network service.
Code Transfer	The ability for a Mobile Code Publisher to change the Resolving CMP for a single or multiple Indirect Code Identifiers.
Direct Code	A Mobile Code that contains either: (a) content for direct consumption by the device, or (b) the address of content (or a service) to be accessed (typically, a URI [URI]).
Home CMP	The CMP to which a particular MCC is configured to send all Code Resolution requests. Where applicable in a Split-CMP deployment scenario, the Home CMP may be a Split-CMP-Parent.
Indirect Code	A Mobile Code that contains an Indirect Code Identifier.
Indirect Code Identifier	An identifier in the Indirect Code that has to be resolved in order to access the intended content or service. See also Code Resolution.
Mobile Code	A 1D or 2D barcode as read by camera-equipped devices.
Mobile Code Client	The MC Enabler software entity that resides in the device, and contains the functionality to acquire, decode, and extract the encoded information for further processing as required. This is often referred to as a Mobile Code Reader and these terms can be used synonymously.
Mobile Code Data Format	The syntactical description of the information contained within a Mobile Code.
Mobile Code Publisher	This is a brand (business, organisation or individual) who distributes certain content or services (e.g., an advertising campaign) to a mass audience by using Mobile Code Scanning as a channel.
Mobile Code Registry	A local registry responsible for sub-allocation of Mobile Code Routing Prefixes within the ranges of Routing Prefixes obtained from OMNA. The Mobile Code Registry (MCR) also supports a data look-up facility accessible by authorised principals (e.g. CMPs or Split-CMP-Parents) for Routing Prefixes in its database.
Mobile Code Sales Agency	The Mobile Code Sales Agency ensures the best Mobile Code service or campaign success by coordinating business topics and related activities on behalf of the Mobile Code Publisher.
Mobile Code Scanning	The physical act of capturing a Mobile Code Symbology and decoding the information contained within the Mobile Code.
Mobile Code Service Policy	A set of Policy Conditions [OMADICT] that convey any service level constraints that are placed on Code Resolution. Mobile Code Service Policy is typically defined by the Mobile Code Publisher and is applicable to one or more Indirect Code Identifiers.
Remote CMP	The CMP that receives a Code Resolution request when the Home CMP (or Split-CMP-Parent, where applicable) is unable to resolve a particular Indirect Code Identifier.

Resolution Identifier	That part of the Indirect Code Identifier that is used to index the content or service.
Resolving CMP	The CMP (or Split-CMP-Child, where applicable) that is able to resolve a particular Indirect Code Identifier.
Routing Prefix	That part of the Indirect Code Identifier that contains a value that is uniquely assigned to the CMP (or Split-CMP-Child, where applicable) and is used for routing.
Split-CMP-Child	A CMP in the Split-CMP deployment scenario, where only the Code Resolution function is implemented. In addition, subject to business relationship, a Split-CMP-Child may be associated with one and only one Split-CMP-Parent.
Split-CMP-Parent	A CMP in the Split-CMP deployment scenario, where only the Code Clearing House function is implemented. In addition, subject to business relationship, a Split-CMP-Parent may be associated with multiple Split-CMP-Children.
Symbology	The algorithm by which data is encoded as visual elements (typically arrangements of lines or squares), and the resultant "look and feel" for the user.

3.3 Abbreviations

1D	1-Dimensional
2D	2-Dimensional
CCH	Code Clearing House (function)
CMP	Code Management Platform
CR	Code Resolution (function)
CTIA	Cellular Telephone Industries Association ("The Wireless Association")
EAN	European Article Number, see EAN/UPC
EAN/UPC	Barcode Symbology family including EAN-8, EAN-13, UPC-A, and UPC-E [EAN/UPC]
FTP	File Transfer Protocol
GSMA	Groupe Speciale Mobile (GSM) Association
ICI	Indirect Code Identifier
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
MC	Mobile Code
MCP	Mobile Code Publisher
OMA	Open Mobile Alliance
QR	Quick Response, a type of barcode Symbology [QR]
UPC	Universal Product Code, see EAN/UPC
URI	Uniform Resource Identifier [URI]

4. Introduction (Informative)

4.1 General Introduction

Mobile Codes – 2D and 1D barcodes (see examples below) have emerged as a promising enabler of the mobile Internet in some markets. Camera-equipped handsets now have good enough optics, image resolution and processing capacity to read mobile codes on printed materials and electronic displays. These symbols or 'Symbologies' (see Fig. 1) encode information such as, URLs, phone numbers, and in-line content (e.g. business cards).

There is, however, still a lack of interoperability between different markets and players. The majority of consumers are unlikely to adopt the technology before it comes pre-installed on their mobile devices. Similarly, marketing, publishing and other industries that are otherwise motivated to provide mobile codes will not adopt them without adequate potential for consumer take-up. That in turn would entail deployment on a large variety of mobile devices, and interoperability between different service providers.

Example			
Symbology	QR [QR]	Data Matrix [DATAMATRIX]	EAN-13 [EAN/UPC]
Data	http://www.openmobilealliance.org	http://www.openmobilealliance.org	5901234123457

Figure 1 – Symbology Examples

4.2 Actors and Roles

As described in [OMAWP] Section 6.1 therein, two methods of encoding data in the mobile code are: a) Direct mobile codes, and b) Indirect mobile codes. Due to more elaborate network functions required for the Indirect Mobile Code ecosystem, it is useful to highlight the primary actors and their respective key roles in major advertising campaigns using Indirect Mobile Codes. This information is motivated by knowledge gained from extensive consultation with stakeholders including the advertising community and operators in both the GSMA and CTIA.

Note that other mobile code usage scenarios not related to advertising campaign may not involve the Mobile Code Sales Agency.

4.2.1 Mobile Code Publisher (MCP)

In the case of Indirect Codes, the Mobile Code Publisher (or 'brand') executes a campaign or service by acquiring Indirect Code Identifiers (ICIs) from the Code Management Platform, creating a Symbology image for each ICI and then publishes these images as Mobile Codes in print or electronic media for distribution. The Mobile Code Publisher may optionally contract a Mobile Code Sales Agency (i.e., a broker or 'middleman' entity) that acts on its behalf in different capacities. Such capacities may range from turnkey advertising campaign design, results tracking & reporting, or simply obtaining ICIs from the CMP, or including encoding of ICIs into Symbology images for distribution. The Mobile Code Sales Agency exists as a surrogate and may act as a trusted broker on behalf of the Mobile Code Publisher, but is not deemed as a sufficiently distinct actor in the Indirect Mobile Code ecosystem.

In the case of Direct Codes, the Mobile Code Publisher may encode the Mobile Code data into the Direct Code himself, or via a business partner.

4.2.2 End User

In the context of Mobile Codes, the end user is the consumer of the content or service accessed via Mobile Code scanning.

4.2.3 Mobile Code Client (MCC)

In the case of Direct Codes, the Mobile Code Client (also commonly referred to as 'Mobile Code reader') processes the decoded Mobile Code data appropriately (e.g. triggering a browsing session based on the decoded URL from the image).

In the case of Indirect Codes, the MCC is configured to send the decoded Mobile Code data containing the ICI to a designated CMP to resolve acquired Indirect Codes. Although the MCC residing in the mobile device may interact with other components in the device (e.g. camera, OS or other resident applications), only interactions between the MCC and the server entities in the network are of interest in the MC Enabler.

4.2.4 Mobile Device

In the MC Enabler, the mobile device hosts and supports operations of the MCC insofar as its interaction with other relevant components in the device (e.g. camera, OS and other resident applications).

4.2.5 Code Management Platform (CMP)

The Code Management Platform is only used in the Indirect Code ecosystem. See inter-related definitions of Code Management Platform, Code Clearing House function, Code Resolution function, Split-CMP-Parent, Split-CMP-Child and Code Transfer in Section 3.2.

The Code Management Platform (CMP) performs the two primary functions: Code Clearing House (CCH) function and Code Resolution (CR) function. Other ancillary functions supported by the CMP include: Mobile Code registration and optionally Code Transfer. The CMP functions typically are fulfilled within a single ownership & operational environment; however, diverse business relationships in different markets may require deployment of the CCH functions and CR functions in physically separate ownership & operational settings. To enable such a business requirement and deployment scenario, the CMP may be split into two physically separate parts (i.e., Split-CMP-Parent and Split-CMP-Child).

4.2.6 Mobile Operator

In the MC Enabler, the mobile operator is responsible for the following key roles:

It provides data connectivity service up to the transport level only; it might not have any visibility of the Mobile Code Scanning application (i.e., does not know the meaning of specific interactions between the MCC and the network server entities). As such, it is responsible for all normal data usage charging process, unless otherwise specified.

For Indirect Codes, the mobile operator may in some cases also assume the role of the CMP provider, subject to market and/or regulatory conditions. When a CMP (or Split-CMP-Parent, where applicable) has management and support responsibilities of the MCC, that CMP is referred to as the Home CMP (see Section 3.2 - Definitions).

The Home CMP provider (may or may not be a mobile operator) performs the management and support functions of the MCC and collaborates with other CMPs (referred to as the Remote CMPs) to resolve Indirect Codes for the benefits of the end user. In addition, where legally permissible and technically feasible, the Home CMP may optionally collect & report additional user and mobile device related information that may be of interest to Mobile Code Publishers.

4.2.7 Mobile Code Registry (MCR)

The Mobile Code Registry is responsible for assignment of Routing Prefixes (see Section 3.2 - Definitions)** to associated CMPs that it serves. It does so by sub-allocating Mobile Code Routing Prefixes within the ranges of Routing Prefixes which it obtained from the root-level Routing Prefix directory administrator mandated by OMA (anticipated to be OMNA). The MCR also maintains a repository of network addresses of associated CMPs and supports a real-time data look-up facility for CMP routing information based on the assigned Routing Prefixes.

** Note: Formatting of the ICI and CMP Routing Prefix may involve further decomposition into additional sub-parts, details of which are defined in the Technical Specification. In addition, the optionality of the MCR and other alternative means to realise the equivalent MCR functions are also addressed therein.

4.2.8 Summary

The following summary indicates all the key actors identified in the previous subsections:

- Mobile Code Publisher (or brand)
- End user
- Mobile Code Client (also commonly referred to as Mobile Code reader or scanner)
- Mobile device
- Code Management Platform
- Mobile Operator (and Home CMP provider)
- Mobile Code Registry

5. Mobile Codes Enabler Description (Informative)

5.1 Introduction

This version of the MC Enabler specifies normative support required (as well optional features) for a full ecosystem for both Direct and Indirect Codes.

Technology, interface behaviour and procedures for interoperability (some of which are optional) are specified for:

- Symbology(ies)
- Mobile Code Data Format
- Direct encoding of content
- Encoding of Indirect Code Identifiers
- Resolution of Indirect Code Identifiers
- Security, Tracking & Reporting, and Code Transfer procedures

5.2 Version 1.0

This version of the MC Enabler supports all functionality described in Section 6 – Requirements of this document in its entirety, unless otherwise indicated.

6. Requirements

The classifications of requirements are generally based on the level of support indicated in the development of this Enabler, including business/market, regional and technical reasons.

6.1 Modularisation

6.1.1 Symbology

This functional module includes the requirements for mandating certain Symbology(ies), symbol creation, physical aspects of the symbols, robustness, reliability, choice of Symbology(ies), and decoding aspects.

6.1.1.1.1 Mobile Code Data Format

This functional module includes requirements on application identifiers, element identifiers, messaging formats, payload types, and decoding aspects.

6.1.2 Service Aspects – offline

This functional module refers to the aspects of the MC Enabler that will enable services *requiring no network interaction* to be performed (e.g., locally scanning and storing a vCard). This functional module includes requirements on various content types, application invocation and character sets.

6.1.3 Service Aspects – online

This functional module refers to the aspects of the MC Enabler that will enable services *requiring network interaction* to be performed (e.g., scanning an Indirect Code, resolving it in the network and browsing to the indicated destination content or service). Service Aspects – online includes requirements on Direct and Indirect Codes, Indirect Code resolution and the back-end architecture needed for this.

6.1.4 System requirements

This functional module includes requirements across client and server software and hardware, including certain terminal requirements pertinent to this Enabler but are not included elsewhere.

6.1.5 User Interaction requirements

This functional module includes specific user interaction requirements (e.g., notifications, user authorisation, and user authentication).

6.1.6 Security

This functional module includes specific security requirements (e.g., authentication, and confidentiality).

6.2 High-Level Functional Requirements

Label	Description	Enabler Release	Functional Module
SYMB-001	The MC Enabler SHALL mandate at least one open standards defined Symbology.	MC 1.0	Symbology
SYMB-002	The MC Enabler SHALL only mandate open standards defined Symbology(ies).	MC 1.0	Symbology
SYMB-003	The MC Enabler Symbology(ies) SHALL be compatible with the Mobile Code Data Format(s)	MC 1.0	Symbology

Label	Description	Enabler Release	Functional Module
SYMB-004	The MC Enabler SHALL make it possible for the Service Provider to provision or update the MCC to support additional Symbology(ies), subject to the capabilities and access privileges of that mobile device. NOTE: Additional Symbology(ies) as mentioned above may include ones not mandated by the MC Enabler.	MC 1.0	Symbology
SYMB-005	If a Symbology is technically capable of supporting both Direct Codes and Indirect Codes, and is supported by a MCC, the MC Enabler SHALL be able to use the Symbology for both Direct Codes and Indirect Codes.	MC 1.0	Symbology
SYMB-006	The Mobile Codes Symbologies mandated by the MC Enabler SHALL support error correction.	MC 1.0	Symbology
SYMB-007	The Mobile Code Symbologies not mandated by the MC Enabler SHOULD support error correction.	MC 1.0	Symbology
SYMB-008	The Mobile Codes Symbologies MAY support multiple error correction levels (tradeoffs between size and accuracy).	MC 1.0	Symbology
SYMB-009	The Mobile Codes Symbologies mandated by the MC Enabler SHALL be implemented in accordance with their respective open standards Symbology Specification.	MC 1.0	Symbology
MCDF-001	The Mobile Code Data Format SHALL be able to support a payload of an ICI.	MC 1.0	Mobile Code Data Format
SA-ON-001	The MC Enabler SHOULD support Code Transfer that allows an ICI to be transferred from one Resolving CMP to another such that the new Resolving CMP shall become responsible for resolving this identifier.	MC 1.0	Service Aspects – Online
SA-ON-002	The ICI SHALL contain a CMP Routing Prefix and a Resolution Identifier.	MC 1.0	Service Aspects – Online
SA-ON-003	Each ICI SHALL be globally unique.	MC 1.0	Service Aspects – Online
SA-ON-004	Each CMP Routing Prefix SHALL be globally unique and identify one and only one Resolving CMP.	MC 1.0	Service Aspects – Online
SA-ON-005	The MCR SHALL support assignment of at least one Routing Prefix to each CMP that it serves.	MC 1.0	Service Aspects – Online
SA-ON-006	The MC Enabler SHALL enable Routing Prefixes such that they are globally unique.	MC 1.0	Service Aspects - Online
SA-ON-007	The MC Enabler SHALL enable the Resolving CMP to be aware of the mappings between all locally hosted ICIs with their associated content, or addresses of content or service.	MC 1.0	Service Aspects – Online
SA-ON-008	The MC Enabler SHALL enable routing of the ICI to its Resolving CMP that is uniquely able to resolve the specific identifier to its associated content or address of content or service.	MC 1.0	Service Aspects – Online
SA-ON-009	The MC Enabler SHALL enable the Resolving CMP to be able to resolve and deliver the content or address of content or service to the requestor.	MC 1.0	Service Aspects – Online
SA-ON-010	The MC Enabler SHALL enable the MCR to maintain a one to one mapping of CMP Routing Prefix with an associated network address through which to reach the CMP.	MC 1.0	Service Aspects – Online

Label	Description	Enabler Release	Functional Module
SA-ON-011	The MC Enabler SHALL enable the CMP to be able to locally cache information on the mapping between other CMP Routing Prefixes and associated network addresses through which to reach the other CMPs.	MC 1.0	Service Aspects – Online
SA-ON-012	There SHALL be only one Global Mobile Code Registry	Deleted	Service Aspects – Online
SA-ON-013	The MC Enabler SHALL enable the MCR to maintain an authoritative list of Resolving CMP (including relevant Split-CMP-Parent, where applicable) Routing Prefixes and their associated network addresses.	MC 1.0	Service Aspects – Online
SA-ON-014	The MC Enabler SHALL enable the MCR to be able to deliver the CMP network address(es) to the requestor	MC 1.0	Service Aspects – Online
SA-ON-015	The MC Enabler SHALL enable the MCR to maintain an authoritative database of ICIs that have been transferred between old and new Resolving CMPs (including relevant Split-CMP-Parents, where applicable) and their associated network addresses	MC 1.0	Service Aspects – Online
SA-ON-016	The MC Enabler SHALL enable the MCR to make the full (or partial) database of transferred ICIs available to a CMP.	MC 1.0	Service Aspects – Online
SA-ON-017	The MC Enabler MAY utilise Symbology type indication detected as part of resolution of the Indirect Mobile Code.	MC 1.0	Service Aspects – Online
SA-ON-018	The MC Enabler MAY be able to utilise supplemental information not contained within the Mobile Code, but included by MC Enabler entities, to supplement Code Resolution, specifically: • Identification of the Mobile Code enabled device; • Identification of the end user associated with the MCC; • Subscriber information from the service provider; • Additional information (e.g., information added by a Mobile Code reader application).	MC 1.0 only for the 2nd and 4th bullets. The 1st and 3rd bullets are for future release.	Service Aspects – Online
SA-OFF-001	The MC Enabler SHALL support the encoding of business cards in the Symbology.	MC 1.0	Service Aspects – Offline
SA-OFF-002	The MC Enabler SHALL be able to recognize and process business card information (e.g., name, addresses, company name, email addresses, phone numbers, birthday, nickname and URLs).	MC 1.0	Service Aspects – Offline
SA-OFF-003	The MC Enabler SHALL support the encoding of at least the following: • email address • phone number • http and https URI • sms URI • mailto URI • tel URI • im URI	MC 1.0 Except for sms URI, mailto URI and im URI; all of these are for future release.	Service Aspects – Offline

Label	Description	Enabler Release	Functional Module
SA-OFF-004	The MC Enabler SHALL support the encoding of multiple characters set including: • numeric • alphanumeric • special character sets • 2 byte character sets (e.g., Asian languages) • plain text • international text	MC 1.0	Service Aspects – Offline
SA-OFF-005	The MC Enabler MAY expose the data that was read from a Direct Code to an execution environment through an application interface.	MC 1.0	Service Aspects – Offline
SA-OFF-006	The MC Enabler MAY support application invocation that is to be executed in an execution environment.	MC 1.0	Service Aspects – Offline
SYS-001	The MC Enabler SHALL enable the Direct Mobile Codes to be capable of containing content. The type of content SHALL be declared in the Mobile Code (e.g., by MIME type [MIME]).	For future release	System Requirements
SYS-002	The MC Enabler SHALL enable the MCC to invoke an appropriate application, based on the type of content, including: • If a phone number is selected, the MC Enabler SHALL be able to invoke an application to initiate a voice call, or SMS/MMS message client. • If an email address is selected, the MC Enabler SHALL be able to invoke an email client. • If a URL is selected, the MC Enabler SHALL be able to invoke a browser to access the designated URL, or an appropriate application to store the URL in a designated storage. • If business card information is selected, the MC Enabler SHALL be able to invoke an application to store the data in the phone book. • If location data is selected, the MC Enabler SHALL, for Indirect Mobile Codes, be able to invoke a location application on the device.	MC 1.0	System Requirements
SYS-003	The MC Enabler SHALL support collecting and reporting of anonymous user information provided by the end user voluntarily, subject to legal and technical limitations.	MC 1.0	System Requirements
SYS-004	When user personal data collection and reporting is implemented, the MC Enabler SHALL provide a means for the end user to “Opt-In” or “Opt-Out” (i.e. enable or disable) of user personal data collection and reporting for Code Scanning processes under the following conditions: • Default for all Code Scanning processes. • Per Code Scanning process.	MC 1.0	System Requirements

Label	Description	Enabler Release	Functional Module
SYS-005	When user personal data collection and reporting is implemented, the MC Enabler SHOULD support the collection of, user attributes based on information entered by the end user on a voluntary, or "Opt-In" basis, for example: • Age • Gender • Postal Code/Zip Code • Household Income	MC 1.0 Deleted support of Preferred language.	System Requirements
SYS-006	When User personal data collection is implemented by the MC Enabler, it SHALL be possible for the end user to update, modify or delete the information previously entered by the end user.	MC 1.0	System Requirements
SYS-007	The MC Enabler SHOULD support tracking and logging of user code scanning behaviours subject to legal and technical limitations.	MC 1.0	System Requirements
SYS-008	When tracking and logging of user code scanning behaviours are implemented, the MC Enabler SHALL provide a means for the User to "Opt-In" or "Opt-Out" (i.e. enable or disable) related to the tracking and logging of user code scanning behaviours under the following conditions: • Default for all Code Scanning processes. • Per Code Scanning process.	MC 1.0	System Requirements
SYS-009	When tracking and logging of user code scanning behaviours are implemented, the MC Enabler SHALL provide a means to account for attributes for unique user reporting and statistical reporting. For example: • User personal data collected as per SYS-008, as available. • Number of code scans. • Date and Time of code scans. • Identification of Network from which the code scans are originated. • User mobile device make and model.	MC 1.0	System Requirements
SYS-010	The MC Enabler MAY enable the CMP (or Split-CMP-Parent, where applicable) to support a means to access MNO subscriber profile database pertinent to each end user.	For future release	System Requirements
SYS-011	When CMP (or Split-CMP-Parent, where applicable) access to MNO Subscriber Profile Database is implemented, the MC Enabler SHOULD enable it to be able to access attributes pertinent to the end user, for example: • Data usage tariff plan subscribed • Geo-Location data	For future release	System Requirements

Table 1: High-Level Functional Requirements

6.2.1 1D Barcode Specific Requirements (For Future Release)

Label	Description	Enabler Release	Functional Module
SYS-012	The MC Enabler SHALL be able to process the EAN/UPC (ISO/IEC 15420) family of 1D barcodes as Mobile Codes.	For future release	System Requirements

Label	Description	Enabler Release	Functional Module
SYS-013	The MC Enabler SHOULD enable the MCC be able to process EAN/UPC barcodes	For future release	System Requirements
SYS-014	The default processing of EAN/UPC barcodes SHOULD be made common with that of 2D Indirect Mobile Codes, by combining the Symbology identifier with the identifier read from the barcode as input to the Indirect resolution system.	For future release	System Requirements
SYS-015	MC Enabler components SHALL NOT modify the URI associated with a specific ICI without prior agreement with the Mobile Code Publisher.	MC 1.0	System Requirements
SYS-016	MCCs MAY support customised end user-selectable handlers (e.g., downloaded Java applets) for the data read from EAN/UPC codes. (E.g., for independent information-provision concerning consumer products).	MC 1.0 Support of EAN/UPC is for future release.	System Requirements

Table 2: High-Level Functional Requirements – 1D Barcode Specific (For Future Release)

6.2.2 Security

Label	Description	Enabler Release	Functional Module
SEC-001	The MC Enabler network entity (i.e., Home CMP, Remote CMP, Resolving CMP and MCR) SHALL be a trusted server.	MC 1.0	Security
SEC-002	When resolving an ICI, the trusted server and the MCC SHALL be able to provide security measures to protect the end user (from phishing, spam, viruses, etc.).	MC 1.0	Security
SEC-003	The MC Enabler SHALL enable the trusted server to be able to check the validity of the ICI and provide associated ICI details to the end user prior to resolving the ICI.	MC 1.0	Security
SEC-004	When resolving an ICI, the MC Enabler SHALL provide security measures to protect network entities from attacks (e.g., Denial of Service, man-in-the-middle etc.).	MC 1.0	Security
SEC-005	The MC Enabler SHALL enable the MCC to be able to communicate in a secure manner with a trusted server (see SEC-001) to resolve ICIs.	MC 1.0	Security
SEC-006	The MC Enabler SHALL provide secure communication between the network entities.	MC 1.0	Security
SEC-007	The MC Enabler SHOULD support for Indirect Mode a non-repudiation mechanism between the Mobile Code Publisher and the end user.	For future release	Security

Table 3: High-Level Functional Requirements – Security

6.2.2.1 Authentication

Label	Description	Enabler Release	Functional Module
SEC-008	The MC Enabler SHOULD support for Indirect Codes the authentication of the source of the Mobile Code by the MCC at the time of processing the Mobile Code.	MC 1.0	Security

Label	Description	Enabler Release	Functional Module
SEC-009	The MC Enabler MAY enable the Resolving CMP to authenticate the requesting MC Client based on various profile criteria.	MC 1.0	Security

Table 4: High-Level Functional Requirements – Authentication

6.2.2.2 Authorization

Label	Description	Enabler Release	Functional Module
SEC-010	The MC Enabler SHALL enable the MCC to be securely updatable or reconfigurable from a trusted server.	MC 1.0	Security

Table 5: High-Level Functional Requirements – Authorization

6.2.2.3 Data Integrity

Label	Description	Enabler Release	Functional Module
SEC-011	The MC Enabler MAY enable the Home CMP or Resolving CMP in conjunction with the MCC to support a security mechanism (e.g., digital signature) to validate Indirect Codes.	MC 1.0	Security
SEC-012	The security mechanism, if present in Indirect Codes, MAY be used by the MCC and CMP to validate the Indirect Code.	MC 1.0	Security
SEC-013	The MC Enabler MAY enable the trusted server and the MCC to support a security mechanism (e.g., digital signature) to validate Direct Codes.	MC 1.0	Security
SEC-014	The MC Enabler MAY enable the security mechanism, if present, in Direct Codes to be validated by the MCC.	For future release	Security
SEC-015	The MC Enabler SHOULD support for Indirect Mode and MAY support for Direct Mode the verification of the integrity of Mobile Code Payload.	MC 1.0 Except for support for Direct Codes, which is for future release.	Security

Table 6: High-Level Functional Requirements – Data Integrity

6.2.2.4 Confidentiality

Label	Description	Enabler Release	Functional Module
SEC-016	The MC Enabler SHALL provide security measures to prevent exposure of network sensitive information (e.g., network entity addresses, network topology).	MC 1.0	Security

Label	Description	Enabler Release	Functional Module
SEC-017	The MC Enabler SHOULD support for Indirect Mode and MAY support for Direct Mode the confidentiality (e.g., via encryption) of the Mobile Code Payload as a secret between the Mobile Code Publisher and end user. NOTE: This is motivated by closed user group use cases.	For future release	Security

Table 7: High-Level Functional Requirements – Confidentiality

6.2.3 Charging

Charging information for the MC Enabler in this section refers to requirements to track chargeable events that are unique to Mobile Code scanning which can be used as a basis to support possible charging based on prevailing online advertising purchase models. Such charging models are considered widely accepted to Mobile Code Publishers/brands executing advertising campaigns. Unless otherwise specified, all charging information requirements herein are applicable to Indirect Codes used in advertising campaigns.

The MC Enabler, in Indirect Codes, SHOULD support tracking of chargeable events for possible charging between different actors using the MC Enabler.

Label	Description	Enabler Release	Functional Module
Conditionality of Main Requirement			
SYS-017	Chargeable events to be tracked in the MC Enabler for Indirect Codes SHOULD support the following online advertising purchase model relevant to the Mobile Code Scanning: **COST PER CLICK (CPC) CHARGING:** This is based on every time the user "clicks on", or otherwise interacts with, the Mobile Code Publisher's content or service as a direct result from the user's initial Mobile Code Scanning.	MC 1.0	System Requirements
Dependent Functional Requirements			
SYS-017A	If the MC Enabler supports SYS-017, then it SHALL track the number of times the user initiates access to, or otherwise invokes the Mobile Code Publisher's content or service.	MC 1.0	System Requirements
SYS-017B	If the MC Enabler supports SYS-017, then it SHALL correlate between the first user access and subsequent user accesses to the Mobile Code Publisher's content or service access points (e.g., web portal browsing, downloading of a video clip).	MC 1.0	System Requirements
Conditionality of Main Requirement			
SYS-018	Chargeable events to be tracked in the MC Enabler for Indirect Codes SHOULD support the following online advertising purchase model relevant to the Mobile Code Scanning: **COST PER ACTION /ACQUISITION (CPA) CHARGING:** This is based on performance or effectiveness of the advertising campaign; whereby 'Action' or 'Acquisition' is defined as the completion of a recordable event by the user as a direct result from the user's initial Mobile Code Scanning. Note that user Action is uniquely defined and agreed between the service provider and Mobile Code Publisher relative to its specific content or service.	For future release	System Requirements
Dependent Functional Requirements			

Label	Description	Enabler Release	Functional Module
SYS-018A	If MC Enabler supports SYS-018, then it SHALL track the number of "Recordable User Action" Completion Indications. Note: A "Recordable User Action" is defined within this context as possessing all of the following attributes: 1. It involves network based application interactions. 2. Upon its completion, it generates a specific Completion Indication that is observable, repeatable and traceable using an objective method. Examples of pertinent "Recordable User Actions" include: completion of a Mobile Code Publisher specified application for user online registration, opening of an online account, signing up to a online distribution list or taking an online survey, etc.	For future release	System Requirements
SYS-018B	If MC Enabler supports SYS-018, then it SHALL correlate each "Recordable User Action" Completion Indication with the user access to the Mobile Code Publisher's content or service as a direct result from the user's initial Mobile Code Scanning.	For future release	System Requirements
Conditionality of Main Requirement			
SYS-019	Chargeable events to be tracked in the MC Enabler for Indirect Codes SHOULD support the following online advertising purchase model relevant to the Mobile Code Scanning: **COST PER CONVERSION (CPCV) CHARGING:** This is based on the highest degree of effectiveness of an advertising campaign in that the user is converted from a prospective into an actual customer/subscriber of the Mobile Code Publisher. 'User Conversion' is defined as completion of a recordable user action that carries certain commitments to the Mobile Code Publisher's offerings as a direct result from the user's initial Mobile Code Scanning. Note that User Conversion is uniquely defined and agreed between the service provider and Mobile Code Publisher relative to its specific content or service.	For future release	System Requirements
Dependent Functional Requirement			
SYS-019A	If MC Enabler supports SYS-019, then it SHALL track the number of "Recordable User Conversion" Completion Indications. Note: A "Recordable User Conversion" is defined within this context as possessing all of the following attributes: 1. It involves network based application interactions. 2. Upon its completion, it generates a specific Completion Indication that is observable, repeatable and traceable using an objective method. Examples of pertinent "Recordable User Conversions" include: an e-commerce transaction for a purchase, an application for a paid subscription, etc.	For future release	System Requirements

Label	Description	Enabler Release	Functional Module
SYS-019B	If MC Enabler supports SYS-019, then it SHALL correlate each "Recordable User Conversion" Completion Indication with the user access to the Mobile Code Publisher's content or service as a direct result from the user's initial Mobile Code Scanning.	For future release	System Requirements
Conditionality of Main Requirement			
SYS-020	The MC Enabler SHOULD be able to support persistency of the initial resolved content/service URI in order to correlate to the user's subsequent access to Mobile Code Publishers content or service (see SYS-017).	For future release	System Requirements
Dependent Functional Requirements			
SYS-020A	If MC Enabler supports SYS-020, then persistency of the initial resolved content/service URI, SHOULD be configurable (e.g., as to scope, time duration, or both).	For future release	System Requirements
SYS-020B	If MC Enabler supports SYS-020, then persistency of the initial resolved content/service URI SHALL be held by a trusted network entity.	For future release	System Requirements
SYS-020C	If MC Enabler supports SYS-020, then persistency of the initial resolved content/service URI SHALL be auditable.	For future release	System Requirements
SYS-021	The MC Enabler SHOULD be able to support cost defraying of the User's data transport usage charges and other costs at the discretion of the actors (e.g., Mobile Code Publisher/brand, Code Resolution service provider, and mobile operator). Cost defraying (including possibly zero-rating) for the user applies to post-paid subscription plans only. Cost defraying for pre-paid subscription plans is for further releases. It SHOULD be possible to apply user cost defraying to roaming charges according to national or international categories, individually or jointly.	For future release	System Requirements

Table 8: High-Level Functional Requirements – Charging

6.2.4 Administration and Configuration

Label	Description	Enabler Release	Functional Module
SYS-022	The Mobile Code enabled device SHALL support network configuration of Mobile Code Scanning capability parameters, as initiated by the network service provider.	For future release	System Requirements
SYS-023	The MC Enabler SHALL support the specification of conditions of service for each Mobile Code (i.e., "Mobile Code Service Policy"). MC Service Policy MAY include, for example, the following: • Validity period • Geographic coverage area(s) • Support of defraying cost of data transport charges	MC 1.0 Except for the 3rd bullet; support of defraying cost of data transport charges is for future release.	System Requirements

Table 9: High-Level Functional Requirements – Administration and Configuration

6.2.5 Usability

Label	Description	Enabler Release	Description
UINT-001	The MC Enabler SHALL NOT suppress any user confirmation messages generated by other entities associated with processing a Mobile Code.	MC 1.0	User Interaction
UINT-002	The end user SHALL be able to set personal preferences within the MCC.	MC 1.0	User Interaction
UINT-003	The MCC SHOULD read Mobile Codes in such a way as to provide the end user with real-time feedback on when a code has been read. The MCC MAY offer reading static image capture as an alternative in difficult situations.	MC 1.0	User Interaction
UINT-004	The MC Enabler SHOULD make it unambiguous to the end user which Mobile Code(s) will be processed. (E.g., if several Mobile Codes are in the field of view, the one selected by the end user would be processed.)	MC 1.0	User Interaction
UINT-005	Once a Mobile Code has been read, the MC Enabler SHALL make it possible to provide the end user with information regarding: (1) If it is known (Direct Code, or resolved ICI), the type of content stored in-line or details of the network access needed for the service (URI, phone number, etc.); or if it is unknown (unresolved ICI), an indication that the information must first be fetched from the network; (2) The text string optionally included in the Mobile Code.	MC 1.0	User Interaction
UINT-006	The MC Enabler SHALL enable the end user to be notified when it is not possible to process the Mobile Code. (E.g. the mobile device does not support FTP; the MCC cannot extract the data; Home CMP cannot route to the Resolving CMP; or Mobile Code Service Policy reasons.)	MC 1.0	User Interaction
UINT-007	The MC Enabler SHOULD notify the end user if the Mobile Code is read but the Mobile Code Data Format is not recognized.	MC 1.0	User Interaction
UINT-008	The MC Enabler SHOULD enable the MCC to inform the end user about the content or address of content or service after Mobile Code Scanning and/or Code Resolution (e.g., SMS, phone call, URI).	MC 1.0	User Interaction
UINT-009	The MC Enabler SHALL support obtaining user authorisation before executing the application that is to be invoked by the data in the Direct Code, or by resolution of the Indirect Code.	MC 1.0	User Interaction

Table 10: High-Level Functional Requirements – Usability

6.3 Overall System Requirements

Label	Description	Enabler Release	Functional Module
SYS-024	The combinations of Symbology and Mobile Code Data Format used by the MC Enabler SHALL be uniquely identifiable.	MC 1.0	System Requirements
SYS-025	The MC Enabler SHALL support provisioning of service parameters.	MC 1.0	System Requirements

Label	Description	Enabler Release	Functional Module
SYS-026	The MC Enabler SHOULD enable the MCC to be able to access available and authorised user preference profile or context information.	MC 1.0	System Requirements
SYS-027	Processing a given Mobile Code from any mobile device SHALL result in access to the content or service determined by the Mobile Code Publisher (subject to the end user being authorised to consume the content or service).	MC 1.0	System Requirements
SYS-028	The MC Enabler SHALL support both Direct and Indirect Mobile Codes using a common set of Mobile Code Symbology(ies), a common Mobile Code Data Format and a common processing methodology.	MC 1.0	System Requirements
SYS-029	In the case of sms URI and mailto URI, the MC Enabler SHALL make it possible for the Mobile Code Publisher to specify whether the 'Body' and/or 'Subject' fields may or may not be changed by the end user. (The end user may decline to send the message.)	For future release	System Requirements
SYS-030	MCC supporting the Direct Mode SHALL support Mobile Codes containing free text that includes any URIs allowed by [OMAURI]. This is to provide backwards-compatibility with the many Mobile Codes containing some combination of text and a URI.	MC 1.0	System Requirements
SYS-031	The Mobile Code Data Format SHALL support embedding additional code-specific text strings (e.g., the message for the user when decoding the Mobile Code).	MC 1.0	System Requirements
SYS-032	The MC Enabler SHALL support a mechanism for returning an Indirect Code-specific text string from the Resolving CMP that can be used for information to the user. Such text is optional for any given Mobile Code.	MC 1.0	System Requirements
SYS-033	The MC Enabler SHALL enable the MCC to allow the end user to access any content or service whose address it has retrieved.	MC 1.0	System Requirements
SYS-034	MCC SHALL support deferred processing of Mobile Code data (e.g., creation of some bookmark list).	MC 1.0	System Requirements
SYS-035	The MC Enabler SHALL make it possible for the MCC to transmit additional information after reading a Mobile Code (e.g., current local weather conditions).	For future release	System Requirements
MCDF-002	The MC Enabler SHALL ensure that the MC Data Format is reasonably distinguishable from any other data encoded in a Mobile Code Symbology.	MC 1.0	Mobile Code Data Format

Table 11: High-Level System Requirements

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
n/a	n/a	No prior version –or- No previous version within OMA

A.2 Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Version OMA-RD-MC-V0_0_1	14 Apr 2008	Cover page	Accepted changes from Draft RD template from REL. Edited cover page to name and date document Removed some comments
Draft Versions OMA-RD-MC-V1_0_0	15 Apr 2008	Cover page, 1, 2, 3, 4, 5, 6.1	Added Scope, References, Definitions, Abbreviations, and Introduction from the OMA MC White Paper [OMAWP] with some modifications. Added Enabler Description taken primarily from the MC Work Item. Added Modularised functional blocks Implemented: OMA-MC-2008-0045R01-CR_MC_RD_Modularisation OMA-MC-2008-0044R01-CR_MC_RD_Enabler_Description OMA-MC-2008-0043R01-CR_MC_RD_Introduction OMA-MC-2008-0042-CR_Mobile_Codes_RD_references_... OMA-MC-2008-0041-CR_MC_RD_Scope
	12 May 2008	Cover page, 3.2, 6.3	Added requirement on backwards compatibility. Corrected Version History table and added implemented CRs. Editorial spelling clean-up. Implemented: OMA-MC-2008-0035R03-INP_Backward_Compatibility_Requirement_A_mechanism_to_enable_OMA_MC_uniquely_identifiable_from_existing_ OMA-MC-2008-0057-CR_Definition_Editorials
	19 Jun 2008	Cover page, Contents, 3.2, 6.2, 6.2.3	Implemented: OMA-MC-2008-0049R02-CR_CR_to_introduce_Mobile_Code_Reader_and_Client_definitions OMA-MC-2008-0050R01-CR_Introduction_of_Symbology_requirements OMA-MC-2008-0056R02-CR_Symbology_Support OMA-MC-2008-0068R01-CR_Update_Code_Reader_Symbology_Requirement OMA-MC-2008-0070-CR_Mobile_Code_Data_Format_Definition
	10 Jul 2008	Cover page, Contents, 6.2, 6.2.4, 6.3, Appendix C	Implemented: OMA-MC-2008-0066-CR_Introduction_of__Symbology_Requirements_Change OMA-MC-2008-0067-CR_Symbology_mandation_requirements_Changes OMA-MC-2008-0076R01-CR_Code_Reader_Requirements OMA-MC-2008-0077R01-CR_User_Experience_Requirements OMA-MC-2008-0081R01-CR_Device_Requirements OMA-MC-2008-0082R01-CR_1D_Barcode_Requirements OMA-MC-2008-0083R01-CR_Feedback_Requirements Added Appendix C – User Experience Guidelines (Informative)

Document Identifier	Date	Sections	Description
	17 Sep 2008	Cover page, Contents, 3.2, 3.3, 6.2, 6.2.1, 6.2.3, 6.2.4, 6.3	Implemented: OMA-MC-2008-0074R01-CR_Initial_Scan_Requirements OMA-MC-2008-0093-CR_Editorial_Clean_up_of_SYS_0001 OMA-MC-2008-0096R04-CR_Mobile_Code_Reader_Related_Definitions OMA-MC-2008-0101R02-CR_Indirect_Code_Portability_Requirements OMA-MC-2008-0103-CR_Abbreviations_on_EAN_and_UPC OMA-MC-2008-0104R01-INP_Security_requirements OMA-MC-2008-0114R01-INP_Requirements_on_Service_Aspects
	15 Oct 2008	Cover page,	Implemented: OMA-MC-2008-0084R02-CR_Basic_Semantics OMA-MC-2008-0123R01-CR_Routing_Prefix_Change OMA-MC-2008-0129R01-CR_Changes_in_Definition_section OMA-MC-2008-0130R01-CR_Changes_in_Abbreviations_section OMA-MC-2008-0132R01-CR_Changes_to_section_6.2 OMA-MC-2008-0133R01-CR_Changes_in_section_6.2.1 OMA-MC-2008-0138R01-CR_Changes_in_section_6.2.4 OMA-MC-2008-0140R01-CR_INP_Symbologies OMA-MC-2008-0141R01-CR_Service_Aspects_offline__Requirements__ OMA-MC-2008-0145R01-CR_Mobile_Code_Use_Policy_Support OMA-MC-2008-0146R01-CR_User_Code_Scanning_contextual_metrics Added information to Version 1.0 and Version 2.0 section. Made changes to Functional Modules, and hence changes to exiting requirements allocation and names. Added, removed and reformatted editor's notes. Requirements were reformatted into REQ suggested formats.
	06 Dec 2008	Cover page, contents, 5.2, 5.3, 5.4, 6.2, 6.2.1, 6.2.2, 6.2.3, 6.2.5, Appendix B	Implemented: OMA-MC-2008-0113R01- CR_Primary_Actors_and_Key_Roles_for_Indirect_Codes_Eco_system OMA-MC-2008-0128R04-CR_MC_data_security_requirements OMA-MC-2008-0144R02-CR_Charging_Information_for_MC OMA-MC-2008-0153-CR_141R01_Edit OMA-MC-2008-0162-CR_Use_Cases_for_MC_Enabler
Draft Versions OMA-RD-MC-V1_0	10 Dec 2008	All	Versioning fixed from 1.0.0 to 1.0 Minor Editorial fixes: Cover page with correct filename Removed duplicate ref in 2.2 Sorted 3.2 alphabetically History box fixed Text and Heading styles fixed
	14 Dec 2008	6.2	Implemented: OMA-MC-2008-0155R01-CR_155R01_Symbologies
	16 Mar 2009	All	Added OMAWP reference. Corrected reference in section 5.2 to refer to OMAWP. Editorial correction in MCC definition. Removed empty Appendix C. Implemented: OMA-MC-2009-0022R01- CR_containing_multiple_CRs_based_on_MC_RDRR_resolution OMA-MC-2009-0024R01-CR_Definition_for_Code_Transfer OMA-MC-2009-0030R01- CR_to_MC_RD_as_per_RDRR_agreed_Action_Points_assigned_to_AT_T OMA-MC-2009-0037-CR_to_MC_RD_Charging_Section_6_2_3
	17 Mar 2009	All	Added Security functional module. Allocated Security requirements against new Security module Renamed majority of Requirements for consistency. Changed font colour to Black in Charging section

Document Identifier	Date	Sections	Description
	18 Mar 2009	All	Edited Actors and roles text. Edited SEC-010 to remove (e.g.) statement. Set language formatting to English (UK). Corrected spelling. Edited formatting.
	24 Mar 2009	6.2.3	Corrected numbering of dependent requirements affected by SYS-018, -019, -020 & -021. Inserted previous SYS-054 "Cost Defraying" charging requirement from RC-MC-V1_0-20081214-D that was omitted inadvertently as the new SYS-022. SYS-xxx requirement numbering after SYS-022 was shifted by one.
	18 Apr 2009	All	Implemented comments from REQ WG (email dated 2009-04-02) as follows: - SEC-011 and SEC-012 marked as for 'Future Release'. - Section 5.3 Version 2.0 deleted. Additional editorial clean-up was performed as follows: - SYMB-005 and SYMB-003 are identical duplicates; SYMB-005 is deleted; all SYMB-xxx numbering after SYMB-003 is updated. - 'Underlines' for SA-OFF requirements are removed. - SYS-017 is missing due to mis-numbering. SYS-018 is renumbered as SYS-017; all SYS-xxx numbering after SYS-017 is updated. - Old SYS-033 (or new SYS-032) has a strikeout on "~~CCH~~" that is a remnant from previous editing; "~~CCH~~" is deleted. - Figure number is added to the illustration of symbology examples; minor rewording in Section 4.1 to add the reference to Figure 1. - Minor corrections due to general 'Spelling & Grammar' checks. - General updates to the Table of Content, Figures and Tables.
Candidate Version: OMA-RD-MC-V1_0	12 May 2009	All	Status changed to Candidate by TP: OMA-TP-2009-0187-INP_MC_V1_0_RD_for_Candidate_Approval Editorial fixes: History Box
Draft Versions: OMA-RD-MC-V1_0	26 Aug 2010	6.2	Incorporated the following agreed change request: OMA-MC-2010-0085-CR_Inclusion_of_Code_Transfer_in_RD Updated to the 2010 template
	21 Oct 2010	All	Implemented agreed resolution of comments as per CONR Report dated 2010-10-21. General editorial clean-up is applied.
	26 Oct 2010	All	Implemented additional email comments as per R&A closed 2010-10-22, affecting the following: SA-On-016; SA-OFF-003; SYS-005, SEC-001, SEC-008 and SYS-027. Appendix B – example use cases are clarified. Formatting & renumbering of the tables and other editorial clean-up are applied.
	02 Nov 2010	All	Updated the change barred version with all the changes applied visible since last candidate version.
	04 Nov 2010	3	Implemented definitions synch-up with the AD and TS. Removed some abbreviations not used in the document. Updated the Table of Content
Candidate Version: OMA-RD-MC-V1_0	30 Nov 2010	All	Status changed to Candidate Status by TP ref # OMA-TP-2010-0475-INP_MC_V1_0_ERP_for_Candidate_Approval

Appendix B. Use Cases (Informative)

This appendix contains example use cases for Mobile Codes.

B.1 Direct URL Encoding

B.1.1 Short Description

A URL is encoded into a Direct Code and a user scans the code with the camera-phone. The Mobile Code Client on the device then decodes the Mobile Code and extracts the URL. The MCC passes this URL to the browser on the device which consumes the URL.

B.1.2 Market benefits

The use case provides a convenient way for users to access online content without manual entry of URLs.

B.2 Indirect URL Resolution

B.2.1 Short Description

An Indirect Code Identifier is encoded into an Indirect Code and a user scans the code with the camera-phone. The MCC on the device then decodes the Mobile Code and extracts the ICI. The MCC then passes this ICI to the MC Enabler network server which returns a URL. The MCC passes this URL to the browser on the device which consumes the URL.

B.2.2 Market benefits

The use case provides a convenient way for users to access online content without manual entry of URLs. This use case can provide benefits over the Direct URL Encoding in terms of post-publishing flexibility, security and value-added service.

B.3 Direct Content Encoding

B.3.1 Short Description

Business card information is encoded into a Direct Code, the user scans the code with the camera-phone. The MCC on the device then decodes the content of the Direct Code (i.e., the business card information) and displays it on the device. Business card information may include name, title, telephone number, email address, which can be saved directly into the phone book. In addition, other functions could be invoked by clicking on the card information on the phone book (e.g., the user clicks on the telephone number to dial it).

B.3.2 Market benefits

The use case provides a convenient way for users to save business card information into the device phone book.