Flashcode Reader International Specifications

International

Version 1.0

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Revision History

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1. Conditions to use the Flashcode Reader International Specifications

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2. General Introduction

This document describes a barcode reader implementation for mobile handsets.
This document is addressed to mobile software providers and handset manufacturers. It should assure a full interoperability between multimedia mobile services from different mobile operators regardless of the technology and of the ecosystem: WAP, Smartphone or i-mode.

3. Object

The barcode reader application will allow users to “capture” simple barcodes from multiple media supports (magazines, business cards, flyers, screens, etc). These barcodes will be used in order to get information on products in shops, to jump to an online site, to compose a SMS, etc.
Barcodes, generated with PC or Web tools, will embed commands, technical parameters, and end-users information. Please refer to section 3.3 for detailed syntax.
Additionally, a client-server mechanism is described to provide PREMIUM services. These services will use a resolving mechanism powered by an HTTP server as described in section 5. They will allow a significant reduction of barcode sizes by using an ID (Service identification number) instead of the content itself (i.e. complete website address, complete vCard, etc). This mechanism will also allow mobile operators to control barcodes validity, to add billing or more if necessary.
A smaller dedicated barcode size (10x10) is also reserved for HTTP redirect commands on mobile handset. Please refer to section 6

Various ways to go to the same i-mode/WAP site :
http://www.contentprovider.com/barcodereader/tag/welcomeyou.htm

	Basic URL (offline code)	Premium URL (online code)	Premium Shortcut (online code)
Datamatrix Barcode	 26x26	 14x14	 10x10
What is encoded	042contentprovider.com/barcodereader/tag/welcomeyou.htm	5410000000000512	000512
Meaning	- 04 : this is a "Basic DO WEB" (simple redirection). - 2 : URL begins with "http://www." - contentprovider.com/barcodereader/tag/welcomeyou.htm: this is the URI.	- 5 : this is a Premium command (the handset will communicate with a barcode server). - 4 : this is a "WEB" service. - 1 : this is a "DO" action. - 0000000000512 : this is the service identifier, sent to the barcode server.	- 000512 is the ID directly encoded without any prefix. Please Refer to the PREMIUM WEB Shortcut section.

4. Barcode technical specification

4.1. Terms and Definitions

The word “barcode” refers to the physical barcode image.
The word “tag” refers to the information actually encoded inside a barcode.

4.2. Encoding scheme / standard

The encoding standard used for barcode is Datamatrix (ISO 16022:2000 / ECC200). This standard includes an error correction mechanism, and is used to generate 2D, black and white, and square barcodes.

4.3. Tag syntax

4.3.1. Parts that compose a tag

A barcode is the encoded representation of data. This data, also called tag, will be interpreted by the handset in order to perform the right action (to send a SMS, to go to a webpage, etc). A tag is the concatenation (&) of two parts:

Tag = ServiceType & Details

The ServiceType part specifies the service the tag supports (TEL for instance).
The Details part is formatted differently (|) depending on the type of tag (PREMIUM or BASIC). If the tag is a BASIC one, it will be some formatted-data. If the tag is a PREMIUM one, it will be an optional ([]) action concatenated (&) with an identification number. Basically, the Details part format can be described as:

Details = Formatted-Data | ([Action &] ID)

As a summary, the syntax of a tag is:

ServiceType	Details
	For BASIC code : Formatted-Data For PREMIUM code : Action (optional) and Service Identification Number

4.3.2. ServiceType part

The "ServiceType" part is a 2 digit number (between 00 and 99).

ServiceType	
RICH WEB	54
RICH CONTACT	52

RICH CALENDAR	57
RICH NOTE	58
TEL	01
VISIO	10
SMS	03
MMS	05
SIMPLE CONTACT	02
SIMPLE CALENDAR	07
SIMPLE NOTE	08
SIMPLE WEB	04

The ServiceType range allows up to 89 additional services, for additional use cases.

The ServiceTypes corresponding to BASIC codes are the following ones

- TEL
- VISIO
- SMS
- MMS
- SIMPLE CONTACT
- SIMPLE CALENDAR
- SIMPLE NOTE
- SIMPLE WEB

The ServiceTypes corresponding to PREMIUM tags are the following ones

- RICH WEB
- RICH CONTACT
- RICH CALENDAR
- RICH NOTE

4.3.3. Details part

The "Details" part is different for BASIC tags and for PREMIUM tags. On a PREMIUM tag, it can even have 2 forms.

"Formatted-Data" for BASIC tags

The "Formatted-Data" part is a list of fields that are separated by a delimiter. Details of fields for each ServiceType are given in section 4.

"Action" and "ID" for PREMIUM tags

The "Action" part is a single digit specifying the way the client application should interact with the content linked to the tag. The "Action" part is optional. If not specified in the tag, the barcode reader application shall apply a default value. This default value depends on ServiceType.

The "ID" part is a zero-filled 13 digits number (between 0000000000001 and 9999999999999). Instructions on handling a PREMIUM Tag are given in section 5

4.4. Tag length

PREMIUM tags have fixed lengths (6, 15 or 16 digits). The handset must support the barcode sizes corresponding to these tag length: 10x10 and 14x14. The handset might also support other barcode sizes for PREMIUM tags. BASIC tags have variable lengths depending on the amount of information they contain. Therefore BASIC barcodes have variable sizes (usually between 16x16 and 26x26). Lengths limits are given in section 10.2 for each barcode size.

4.5. Interoperability requirements

In order to guarantee an interoperability of the flashcode readers, the software supplier or handset manufacturer must implement the core specifications described in this document and more particularly the following ones :

- encoding scheme / standard
- tag syntax and length
- the mandatory ServiceTypes as described in the table hereafter
- the service mechanism for Premium Tag
- the default actions for each ServiceType

4.6. ServiceTypes implementation requirements

The support of all ServiceTypes isn't required. The table below describes the actual level of requirements.

ServiceType	Support
RICH WEB	Mandatory
RICH CONTACT	Optional
RICH CALENDAR	Optional
RICH NOTE	Optional
TEL	Optional
VISIO	Optional
SMS	Optional
MMS	Optional
SIMPLE CONTACT	Optional
SIMPLE CALENDAR	Optional
SIMPLE NOTE	Optional
SIMPLE WEB	Optional

"Optional" means that the handset MAY support the feature and that, if supported, the feature MUST conform to the present specification.

“Mandatory” means that the handset MUST support the feature and that the feature MUST conform to the present specification.
Note that the support of Rich Web Shortcuts is Mandatory.

5. BASIC tags description

5.1. "Formatted-Data" syntax and separator

The exact "Formatted-Data" syntax depends on ServiceType as explained below: each ServiceType uses its own set of fields.
The “|” character (ASCII code 124, or UTF-8 code 0x7F, also called “Pipe” or “Pipeline”) will be used as a delimiter to separate fields in Formatted-data.
In case the “|” has to be used as text in one field, the “\’” (ASCII code 92, or UTF-8 code 0x5C, also called “backslash”) escaping character should be added in front of it (i.e. “\|”).
In case the backslash “\” has to be used as text in one field, it should also be preceded by the escaping character (i.e. “\\”).
The Formatted-Data shall contain at least one “|” character even if only the first field of ServiceType is mandatory.
However, in order to save space (less characters means smaller barcodes), if last fields are empty, trailing “|” delimiters become optional (except for the first delimiter which is always required). When some “|” are missing at the end of the formatted-data string, the tag shall still be readable.
The following table illustrates the effect of the presence of optional delimiters in a BASIC tag.

SMS Examples	
Tag	Interpretation
0312345	FORBIDDEN: a SMS tag shall contain at least one delimiter; this example tag shall be interpreted as a Web Shortcut as defined in section 6
0312345|	SMS TO: 12345 BODY: (empty) TITLE: (empty)
0312345||	SMS TO: 12345 BODY: (empty) TITLE: (empty)
0312345|||	SYNTAX ERROR: a SMS tag cannot have more than three fields

5.2. Default Actions & Behaviors

Default actions are associated to every ServiceType. They are detailed in the table below:

Default Actions & Behaviors		
TEL	DO	Make a voice call to number (1)
VISIO	DO	Make a video call to number (1)
SMS	EDIT	Pre-compose new SMS (2)

		By default, focus should be on “Body”.
MMS	EDIT	Pre-compose new MMS (2) By default, focus should be on “Body”.
SIMPLE CONTACT	SAVE	Save contact to phonebook (1)
SIMPLE CALENDAR	SAVE	Save event to calendar (1)
SIMPLE NOTE	SAVE	Save note to notebook (1)
SIMPLE WEB	DO	Open URL in browser (1)

(1) Ask user confirmation first.
(2) Data is editable by user.
Note that these are recommended interpretations. Actions may be interpreted and executed differently, depending on the platform and on devices capabilities.

5.3. Actions implementation requirements

The handset MUST support the default actions for each ServiceType (as detailed in the “Default Actions & Behaviors” table above).

5.4. TEL

Formatted-Data = NUMBER “|” TITLE
Mandatory Fields = NUMBER
Optional Fields = TITLE

NUMBER is a phone number which can be handled by mobile devices. Its format shall conform to one of the following notations:

- If it is intended to operate internationally, the first character shall be "+" (ASCII code 43, UTF-8 0x2B, called “plus”) followed by the phone number as defined by the E.164 standard (starting with a country code).
- If the phone number is for national usage only, then the field may only contain a phone number without a country code.

Special characters for DTMF extensions shall be supported: “*”(ASCII code 42, or UTF-8 code 0x2A), “#” (ASCII code 35, or UTF-8 code 0x23), “w” (ASCII code 119, or UTF-8 code 0x77) (wait for dial tone), “p” (ASCII code 112, or UTF-8 code 0x70) (1 second pause).

TEL Example	
Tag	Interpretation
01+33146981812|Customer X	TEL NUMBER: +33146981812 TITLE: Customer X

5.5. VISIO

Formatted-Data = NUMBER “|” TITLE

Mandatory Fields = NUMBER
Optional Fields = TITLE

NUMBER is a phone number which can be handled by mobile devices. Its format shall conform to one of the following notations:

- If it is intended to operate internationally, the first character must be "+" (ASCII code 43, UTF-8 0x2B, called “plus”); followed by the phone number as defined by the E.164 standard (starting with a country code).
- If the phone number is for national usage only, then the field only contains a phone number without a country code.

Special characters for DTMF extensions are supported: “*”(ASCII code 42, or UTF-8 code 0x2A), “#”(ASCII code 35, or UTF-8 code 0x23), “w” (ASCII code 119, or UTF-8 code 0x77) (wait for dial tone), “p” (ASCII code 112, or UTF-8 code 0x70) (1 second pause).

VISIO Example	
Tag	Interpretation
10+33612345678|VisioService	VISIO NUMBER: +33612345678 TITLE: VisioService

5.6. SMS

Formatted-Data = TO "|" BODY "|" TITLE
Mandatory Fields = TO
Optional Fields = BODY, TITLE

TO: SMS recipient phone number (from 2 to 20 digits, and an optional leading special character "+" for international notation)
BODY: SMS content (text message)
The limit of SMS body size depends on the actual capacity of the Datamatrix code (see 10.2). If body size exceeds the maximum capacity of one SMS (i.e. 160 characters), the handset may use SMS concatenation according to GSM 03.40 otherwise body field shall be truncated.

SMS Example	
Tag	Interpretation
0312345|12345678 |Download this ringtone!	SMS TO: 12345 BODY: 12345678 TITLE: Download this ringtone!

5.7. MMS

Formatted-Data = TO "|" SUBJECT "|" BODY "|" TITLE
Mandatory Fields = TO
Optional Fields = SUBJECT, BODY, TITLE

TO: MMS recipient phone number (from 2 to 20 digits, and an optional leading special character "+" for international notation) or email address

SUBJECT: MMS subject line
BODY: MMS content (only text message)
The maximum MMS body length depends on the actual capacity of the Datamatrix code (see 10.2). Details on the MMS format and field restrictions can be found in the MMS 1.3 specifications (3GPP Release 6).

MMS Example	
Tag	Interpretation
05support@contentprovider.com |Info|Type in your question|Barcode Info	MMS TO: support@contentprovider.com SUBJECT: Info BODY: Type in your question TITLE: Barcode Info

5.8. SIMPLE CONTACT

Formatted-Data = FN "|" TELCELL "|" “TEL” | EMAIL1 "|" EMAIL2 “|” ADR “|” ORG “|” BDAY “|” TITLE
Mandatory Fields = FN, TELCELL
Optional Fields = TEL, EMAIL1, EMAIL2, ADR, ORG, BDAY, TITLE

These fields (except TITLE) are defined in the vCard 2.1 specification.
TELCELL refers to TEL;CELL.
There are 2 EMAIL fields: EMAIL1 and EMAIL2.
BDAY shall NOT follow the standard “YYYY-MM-DD” syntax, but shall be reduced to “YYYYMMDD”.
BDAY shall NOT include time information.
TITLE is NOT the vCard job title, but the Tag TITLE field (defined in section 8.2).

SIMPLE CONTACT Example	
Tag	Interpretation
02David R. |+336123456789|+33123456789| email@domain.com|||||	SIMPLE CONTACT FN: David R. TELCELL: +336123456789 TEL: +33123456789 EMAIL1: email@domain.com EMAIL2: (Not Available) ADR: (Not Available) ORG: (Not Available) BDAY: (Not Available) TITLE: (Not Available)

The fields set being limited for BASIC tags, PREMIUM tags will be preferred for deliver full vCard based on version 2.1.

5.9. SIMPLE CALENDAR

Formatted-Data = SUMMARY "|" DTSTART "|" DTEND "|" LOCATION "|" ATTENDEE "|" TITLE
Mandatory Fields = SUMMARY, DTSTART

Optional Fields = LOCATION, ATTENDEE, DTEND, TITLE

Date fields (e.g. DTSTART and DTEND) differ from the standard definition (in RFC2445). For optimization purposes, the standard format "YYYYMMDD'T'hhmmss'Z'" shall be reduced to "YYMMDDhhmm". When decoding the tag, missing fields (century and seconds) shall be added, and completed with values YY=20 (21st century) and ss=00. There is a loss of information, and it implies SIMPLE CALENDAR tags shall not be used with dates outside the 21st century.
i.e. "20060221T215624Z" will be encoded to "0602212156" and decoded to "20060221T215600Z".
The UE shall process this decoded UTC time according to its internal time zone setting.

SIMPLE CALENDAR Example	
Tag	Interpretation
07Barcode Presentation|0607011500| |Content Provider Headquarters ||	BASIC EVENT SUMMARY: Barcode Presentation DTSTART: 20060701T150000Z DTEND: (Not Available) LOCATION: Content Provider Headquarters ATTENDEE: (Not Available) TITLE: (Not Available)

5.10. SIMPLE NOTE

Formatted-Data = SUMMARY "|" DESCRIPTION "|" DTSTART "|" TITLE
Mandatory Fields = SUMMARY
Optional Fields = DESCRIPTION, DTSTART, TITLE

"DTSTART" refers to "DTSTART;VALUE=DATE" in RFC2445. However it differs from the standard definition. For optimization purposes, the standard format "YYYYMMDD" shall be reduced to "YYMMDD". When decoding the tag, the missing field (century) shall be added, and completed with value YY=20 (21st century). There is a loss of information, and it implies SIMPLE NOTE tags shall not be used with dates outside the 21st century.
i.e. "20060221" will be encoded to "060221" and decoded to "20060221"
SUMMARY and DESCRIPTION are also defined in RFC2445.

SIMPLE NOTE Example	
Tag	Interpretation
08CPMEET |meeting tomorrow with content provider|050701 |Barcode Meeting	SIMPLE NOTE SUMMARY: CPMEET DESCRIPTION: meeting tomorrow with content provider DTSTART:20050701 TITLE: Barcode Meeting

5.11. SIMPLE WEB

Formatted-Data = URI "|" TITLE

Mandatory Fields = URI
Optional Fields = TITLE

A digit can be used as the first character of the URI to replace the most common URI beginning chartacters. If the URI begins with none of the following, the first character must be a letter.

BASE	
RESERVED	0
http://	1
http://www.	2
https://	3
https://www.	4
rtsp://	5

The complete URI shall be limited to 255 characters. The complete URI shall follow http: (RFC2616) or https: (RFC2818) scheme or rtsp: (RFC2326) scheme.

Depending on protocol used, and URL, the right handset client should be invoked.
i.e. http://www.cp.com/contents/video.3gp shall call the video player if progressive download is used.
i.e. rtsp://www.cp.com/flow.3gp shall call the streaming client.
i.e. http://www.cp.com/welcome.html shall call directly the browser.

6. PREMIUM Tags description and PREMIUM Service mechanism

PREMIUM barcode will embed an ID, which must be used within a HTTP request.
This ID will contain the barcode prefix, in order for the handset to know what kind of command and behavior are expected, plus an optional action digit and a service identification number which will be used by the server to identify the service.

6.1. Actions & behaviors

The "Action" part is a 1 digit number (between 0 and 9). It specifies the way the phone should handle the Tag. It is possible to specify more than one Action by using the sum of their values in the Action field.
This field is optional. The barcode decoder needs to check the Tag length to detect whether the Tag specifies an Action or not. If the Tag has 16 digits (2+1+13), the third digit specifies the action. If it has 15 digits, no action is specified, and then the default action should be used.
If the Tag has 15 digits, it is required to concatenate the default action at the expected position in the Tag (i.e. 540123456789012 => 54 0123456789012) before using it in the request.

ActionType	
DO	1
EDIT	2
SAVE	4

Action	
NOT SPECIFIED	0
DO	1
EDIT	2
EDIT + DO	3
SAVE	4
SAVE + DO	5
EDIT + SAVE	6
EDIT + SAVE + DO	7
RESERVED	8
RESERVED	9

Action Default Values		
RICH WEB	DO	So default prefix is 541
RICH CONTACT	SAVE	So default prefix is 524

RICH CALENDAR	SAVE	So default prefix is 574
RICH NOTE	SAVE	So default prefix is 584

Actions can be interpreted and executed differently, because of various platform and device capabilities. Recommended interpretations:

Recommended Interpretations for Action			
	DO	EDIT	SAVE
RICH WEB	Open URL in browser (3)	Pre-enter URL in browser (2)	Display and propose to add to bookmarks (1)
RICH CONTACT	Display contact details	Pre-fill new contact (2)	Display and propose to save to address book (1)
RICH CALENDAR	Display event details	Pre-fill new calendar entry (2)	Display and propose to add to calendar (1)
RICH NOTE	Display note details	Pre-fill new Note (2)	Display and propose to save to notebook (1)

(1) Ask user confirmation first.
(2) Data is editable by user.
(3) User confirmation may be asked for.
Not all Actions are required to be implemented, due to possible device or platform specific limitations. Only the default Action for each Service is required. In case of limitations, handset implementation should not interfere with commercial services. Please contact your mobile operator.

Action Example	
Prefix Action	Interpretation
545	RICH WEB SAVE and DO (i.e. Add bookmark and Open URL)

6.2. Actions implementation requirements

The handset MUST support the default Action for each ServiceType (as listed in "Action Default Values" table above). The handset SHOULD support the three trivial Actions (DO, SAVE and EDIT) for each ServiceType. The handset MAY support additional Actions (EDIT+DO, SAVE+DO, EDIT + SAVE and EDIT + SAVE + DO).

6.3. ID

By default, 14x14 PREMIUM barcode will contain 16 digit numbers: 3 for prefix and 13 for service identification (ID).

PREMIUM barcode Example

Prefix	Service Identification number
551	0000000000512

In this example, the service identification number 0000000000512, supported by a MMS DO command (=551), is sent to the server. The handset, then, receives the content associated to this ID (n°512) from the server after correspondence database check. The content, interpreted by the handset inside the MMS composer, could be: sender =”014123652356” with topic =”Product no 3484749” and body = “Send me the full catalog of your products by MMS. Thank you”.

6.4. HTTP request

Upon decoding a PREMIUM tag, the UE shall send a HTTP request to the barcode server provisioned in the handset (please refer to section 7.1). This request is the same for all ServiceType.

Request Parameter	
Name	Value
id	Barcode

PREMIUM barcode Request Example	
Tag	Interpretation
5450123456789012	RICH WEB SAVE AND DO URL=http://www.tagserver.com/script.asp?id=5450123456789012

Upon receiving this HTTP request, the barcode server may collect extra information about the user such as his/her handset User-Agent, or even his/her MSISDN (if the operator gives away such kind of information).
The Barcode application shall either rely on the embedded browser software, or if it handles this HTTP request by itselt, it shall use the same User-Agent as the one configured for the handset browser.

6.5. HTTP response

The HTTP response shall be processed in order to launch the right service handler (browser, calendar application, etc). The barcode application shall support various kinds of HTTP responses:

- HTTP Redirect (302 status codes)
- Content Stream (200 status codes)
- Other status codes

The following table details expected responses depending on the tag ServiceType that initiated the request.

Service	HTTP Redirect (URI Scheme)	Content Stream
RICH WEB	http: (RFC2616), https: (RFC2818), rtsp: (RFC2326)	-
RICH CONTACT	-	vCard (v2.1)
RICH CALENDAR	-	iCalendar (RFC2445) vEvent
RICH NOTE	-	iCalendar (RFC2445) vJournal
ANY SERVICE	-	Others (Text, HTML, WML,…)

If the response received is not the response expected for the given tag ServiceType, the barcode application shall let the browser handle the HTTP response.
For instance, if the HTTP response is a 200 status code with “text/html” content type, the barcode application shall let the browser display the HTML page.

6.6. RICH WEB

The response shall be:

HTTP Redirect (302)
Location: <URI>

<URI> contains an URI following http: (RFC2616) scheme, https: (RFC2818) scheme or rtsp: (RFC2326) scheme.

RICH WEB Response Example (with title)
HTTP/1.1 302 Moved Temporarily Server: Apache-Coyote/1.1 Location: http://www.contentprovider.com/ Pragma: title=Content Provider Site Content-Length: 0 Date: Wed, 22 Jun 2005 17:04:36 GMT

6.7. RICH CONTACT

The response shall be:

HTTP OK (200)
Content-Type: text/x-vcard
Content-Disposition: attachment; filename=<filename>.vcf

The attachment is a file containing a vCard (version 2.1).

6.8. RICH CALENDAR

The response shall be:

HTTP OK (200)
Content-Type: text/x-task
Content-Disposition: attachment; filename=<filename>.ics

The attachment is a file containing an iCalendar (RFC2445) vEvent component.

6.9. RICH NOTE

The response shall be:

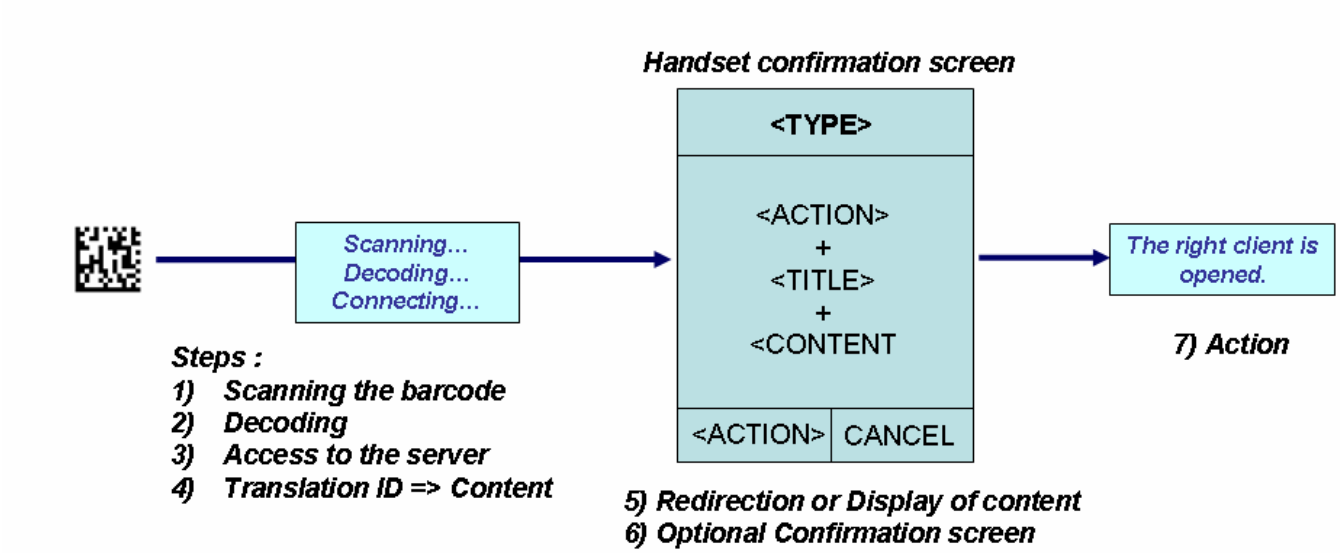
HTTP OK (200)

Content-Type: text/x-note
Content-Disposition: attachment; filename=<filename>.ics

The attachment is a file containing an iCalendar (RFC2445) vJournal component.

6.10. Title description for PREMIUM tag

The HTTP response can include a TITLE value by using an optional "Pragma" Header Field containing a "title=" entry.



Confirmation screen example for a PREMIUM Tel tag.

7. RICH WEB Shortcut Tags

RICH WEB barcode that have an ID smaller than 10^6 (1000000) can be represented by smaller codes, as an alternative to the full Tag.
As a result, it is possible to reduce the size of the barcodes used. However, those barcodes will be limited to only one usage: Web redirection from a mobile handset.
Those codes, called " RICH WEB Shortcuts", have 6 digits (instead of 16 digits), and use 10x10 barcode size.
The barcode decoder needs to check the barcode length to detect such codes. If the barcode has 6 digits, it means it is a “web shortcut”, and the corresponding tag will be recomposed by appending "5410000000" to the shortcut (6 digits).
The resulting ID can then be used as described for a PREMIUM Tag.

RICH WEB Shortcut Example		
Shortcut	Tag	Barcode
123456	5410000000123456	 10x10

8. Handset provisioning

8.1. Barcode server URL setting for PREMIUM tags

By default, the URL of the barcode server to be used for PREMIUM tags is the following one :

http://www.tagserverurl.com

However, the url of any other barcode server can be used.

The Barcode reader application can append the necessary "?id=" to http://www.tagserverurl.com in order to build the proper HTTP request. For instance:

PREMIUM tag value: 5410000000000512
HTTP Request: http://www.tagserverurl.com /?id=5410000000000512

8.2. User confirmations

As specified in section 4.2 for BASIC tags, user confirmations shall be asked for before triggering the instruction .
As specified in section 5.1, for PREMIUM tags, user confirmations may be asked for before triggering the instruction The handset shall again propose a setting to let operators activate or deactivate the display of user confirmations.

8.3. Activation / deactivation of individual BASIC and PREMIUM tag types

The handset shall provide operator settings for activating / deactivating individually every OPTIONAL tag ServiceTypes. The list shall be:

Name: RICH WEB	Value : ON
Name: RICH CONTACT	Value : ON or OFF
Name: RICH CALENDAR	Value : ON or OFF
Name: RICH NOTE	Value : ON or OFF
Name: TEL	Value : ON or OFF
Name: VISIO	Value : ON or OFF
Name: SMS	Value : ON or OFF
Name: MMS	Value : ON or OFF
Name: SIMPLE CONTACT	Value : ON or OFF
Name: SIMPLE CALENDAR	Value : ON or OFF
Name: SIMPLE NOTE	Value : ON or OFF
Name: SIMPLE WEB	Value : ON or OFF

In case a barcode is scanned with a deactivated ServiceType, a simple message shall notify the end-user that this command is not allowed (Please refer to the detailed user interface requirements).

9. Mobile barcode reader User Interface

9.1. User interface requirements

User interfaces should be validated by each operator. Those user interfaces should strictly comply with the handset behaviors described in chapter 5.1..
Please find below some generic recommendations:

Access to barcode interface
The barcode reader interface should be accessible from a menu in the camera application, through the contextual menu or from a dedicated tab.
Barcode interface
When the barcode mode is selected, a target [4 square corners] should be displayed on screen in order to help the user capture the barcode.
The zoom feature [and the macro mode if available] should be set by default in order to prevent the user from zooming in or out to capture a barcode from around 10-15 cm distance.
The user should be able to zoom in and out using sidekeys and the up and down key of the navigation keypad.
Barcode recognition should be automatic.
A sound effect (e.g. Camera sound) should notify the user that a barcode has been recognized.
The user should have the possibility to deactivate this sound effect.
The barcode interface can be hidden by operator setting.
If an indirect tag is recognized and the barcode server is not accessible or unreachable, a pop-up message should be displayed informing the user and suggesting to try again later.
If the barcode recognition is not complete / cannot be executed, an error message should be displayed.
Barcode saving
If the handset is out of coverage, or in the case of a network failure, a pop-up message should inform the user that he is out of coverage and that the barcode has been stored in the history.
A history of the last 30 barcodes captured should be automatically created and updated. The user should be able to deactivate this option.
The title of each barcode should be editable after having been added to the history. By default, barcode names should be: "action type+date".
It should be possible to protect/unprotect barcodes in the history from automatic deletion.
An icon should be displayed in the history list for each barcode to distinguish between action types (e.g. SMS icon for SMS action type).
Barcode behavior
When the barcode has been recognized, the encoded command should automatically be invoked with a confirmation pop-up. Exception: indirect barcodes should directly execute a "WebTo" command and invoke the browser without confirmation. The type of command with the TITLE should also be displayed (e.g. "Do you accept to send a [SMS] to [TITLE]. yes/no").
In the settings, the user should be able to deactivate the display of this pop-up confirmation.
If the barcode has an indirect tag, the standard connecting pop-up should be displayed for connection to the barcode server. A progress bar would be recommended.
Depending on the encoded command, handset behavior should follow the Behaviors for Action interpretations reference table.

9.2. Note about tags TITLE

Both in BASIC and PREMIUM tags, there are optional TITLE information. Their purpose is to briefly describe the content to the end user.
The TITLE information is written inside the Formatted-data for a BASIC tag. The TITLE information is sent by the barcode server for PREMIUM tags.
The user interface shall take advantage of them as best as possible. The TITLE information shall be limited to 70 characters.

10. Hardware requirements

10.1. Digital camera

The decoding should be possible on all cameras (CMOS or CCD sensors), from 300K camera to mega pixels camera.
Barcodes should be readable regardless the presence of Macro lens.
By default, the ZOOM level should be set to capture in perfect condition a barcode from 10 to 15cm distance.

10.2. Performances & QoS

Decoding of all sizes ranging from 10x10 to 26x26 shall be supported. These sizes are listed in Appendix 10.2 .
Decoding performances shall be optimized for 10x10, 14x14, 16x16 and 26x26 sizes. These sizes are highlighted in Appendix 10.2.
Support for sizes bigger than 26x26 is optional.
Barcode reading should be possible from several kinds of supports: newspapers, postcards, magazines, glass, plastic (i.e. CD/DVD cover), mobile screen, stamps, etc.
Different printing resolution could be used: 180 DPI, 300 DPI, 600 DPI, 1200DPI.

11. Appendix

11.1. Datamatrix supported encoding

The data format specified in this document is designed to be embedded in 2D barcodes, using possibly different types. This section details the reference implementation that uses Datamatrix codes. Datamatrix can encode any kind of information (numeric, textual, binary …). Encoding of characters from multiple-bytes charsets is done using ECI (Extended Channel Interpretation).
Default charset is ISO-8859-1 (ECI code 000003). UTF-8 (ECI code 000026) shall also be supported as a minimum requirement.
The encoding algorithm provides efficient optimization methods for storing numeric (i.e. [0-9]) or alphanumeric (i.e. [a-z0-9]) characters. This optimization impacts the quantity of data that can be stored in a Datamatrix having a given number of "modules".
BASIC Tags have 26x26 modules and by default use Datamatrix TEXT encoding (except when ECI is used), optimized for storing:

Latin numeric symbols [0-9]
Latin lowercase alphabet [a-z]

Therefore it is recommended to use this sub-charset in BASIC fields to maximize storage capacity.
Encoding characters out of this sub-charset is possible but will reduce length of data that can be stored (information on maximum capacity is provided below).
PREMIUM Tags have 14x14 modules and store the numeric TagID using ASCII encoding. It is not impacted by neither the length nor the charset of the actual data, since that data is not stored in the Datamatrix.

11.2. Datamatrix encoding capacity

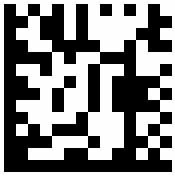
This table shows maximum data that can be stored in a Datamatrix with different encoding optimizations. Note that if the data contains some characters that do not belong to the reference sub-charset, it is not possible to store as much characters.

Size of the barcode	Number of characters [0-9]	Number of characters [a-z0-9]	Number of Bytes
10x10	6	3	1
12x12	10	6	3
14x14	16	10	6
16x16	24	16	10
18x18	36	25	16
20x20	44	31	20
22x22	60	43	28
24x24	72	52	34
26x26	88	64	42
32x32	124	91	60

Detection performances shall be optimized for highlighted sizes.

11.3. Example of Datamatrix barcode

SMS Example	
Tag	Barcode (Datamatrix 22x22)
0312345|12345678|Download this ringtone!	

RICH WEB Example	
Tag	Barcode (Datamatrix 14x14)
5410123456789012	

11.4. Example of a redirection mechanism with URL