OMTP

DISPLAYS

DEFINITION AND REQUIREMENTS

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CONTENTS

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1 INTRODUCTION

This document represents the Display De-fragmentation and Requirements developed within OMTP.

The document defines some recommended classes of displays for mobile terminals. Further classes will be added in future versions of the document with the availability of on-going technologies.

The reason to define these classes comes from the large variety in display characteristics onboard mobile terminals which causes the following main problems to arise:

1. The user experience of 'look & feel' is strongly influenced.

2. The operational costs are increased because application developers and content providers are forced to support all the display formats.

3. The perception of video services is heavily influenced by display (and camera) characteristics.

4. The bandwidth service that offers business opportunities depends on display characteristics.

OMTP addressed the display de-fragmentation issue in order to:

1. Reduce the operational costs.

2. Increase the user perception of the video services provided.

3. Make the specification of requirements for mobile terminals easier and more precise.

4. Reduce the NRE cost due to the re-engineering of application and contents to address new terminals.

See section 6 for some example cases.

1.1 DOCUMENT PURPOSE

This document has a general objective to help in defining terminal requirements and to allow the development and deployment of new services as well as de-fragmenting the display capabilities onboard terminals. In particular, the document concurs with the OMTP Main Objectives:

Facilitate implementation of Open Mobile Terminal Platforms

- Work as appropriate to drive specific mobile terminal platforms to meet OMTP requirements:

  - Influence standardisation of relevant platforms.

  - Work with vendors of proprietary platforms to adopt requirements and/or resulting standards.

❑ Understand implementation roadmap and conformance to requirements.

In particular, it addresses the hardware enablers through the production chain to facilitate OMTP terminal development.

Define De-fragmentation Guidelines

- De-fragmentation guidelines are to reduce costs (for both operators and manufacturers) and increase consistency by defining:

  ❑ Hardware component parameters.

  ❑ Software component parameters.

  ❑ Performance guidelines and benchmarks.

1.2 INTENDED AUDIENCE

The document is intended to be used as reference in:

- Terminal requirements definition by operators.

- Platform and terminal characteristics description.

- Definition of displays in mobile terminal performance.

Some examples of usage follow:

Within terminal requirements*: "Primary display: compliant with OMTP D1 (as defined into OMTP DISPLAYS v1.0)"*.

Within hardware requirements for an application: *"The application needs an OMTP D2 compliant display (as defined into OMTP DISPLAYS v1.0) to be run"*.

Within codecs performances: *"The codecs X manages 12fps referred to OMTP D2 compliant display (as defined into OMTP DISPLAYS v1.0)"*.

Within content database*: "The video is formatted to be viewed with an OMTP D2 compliant display (as defined into OMTP DISPLAYS v1.0)"*.

Within platform description*: "The platform can support OMTP D3 compliant displays (as defined into OMTP DISPLAYS v1.0)"*.

2 DEFINITION OF TERMS

This chapter contains the definition of terms used in this document.

2.1 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] (see [1] in section 9).

- MUST: This word, or the terms "REQUIRED" or "SHALL", means that the definition is an absolute requirement of the specification.

- MUST NOT: This phrase, or the phrase "SHALL NOT", means that the definition is an absolute prohibition of the specification.

- SHOULD: This word, or the adjective "RECOMMENDED", means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.

- SHOULD NOT: This phrase, or the phrase "NOT RECOMMENDED" means that there may exist valid reasons in particular circumstances when the particular behaviour is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behaviour described with this label.

- MAY: This word, or the adjective "OPTIONAL", means that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation which does not include a particular option MUST be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality. In the same vein an implementation which does include a particular option MUST be prepared to interoperate with another implementation which does not include the option (except, of course, for the feature the option provides).

3 MAIN DISPLAY

In this section, the core parameters for primary display are listed.

3.1 CORE PARAMETERS

Resolution	Physical Resolution of the display: 'A' x 'B' pixels It represents the physical resolution of the display. The display SHALL be able to be configured to support this resolution.
Pixel Aspect Ratio	Ratio of the pixel. The display SHALL have this pixel aspect ratio.
Colour Depth	Number of colours. The display subsystem SHALL be able to be configured to support this number of colours.
Frame Rate	fps (frames per second) Display hardware SHALL be able to support a minimum fps bandwidth available for sending data to display. i.e. content of that frame rate should be able to be processed by the hardware.

4 SECONDARY DISPLAY

A second display (e.g. on the front of clamshell terminals) MAY be used. It could be addressed in future releases of OMTP.

5 COMPLEMENTARY DOCUMENT DISPLAY

In the medium term, additional peripheral displays MAY be added. These requirements could be addressed in future releases of OMTP.

6 USE CASES

In this section, some cases to explain the reason of this document are shown.

6.1 USE CASES FOR DISPLAY DE-FRAGMENTATION

UC1: User service perception

Nigel wants to use his operator's new service 'View & Send', based on camera recording and sending of the video. Fabio receives the video but the resolution is not good. Fabio calls his operator customer service to know why that happened.

Carl wants to use his operator's new service 'View Call' with Magnus. They felt that the video quality is too low. Carl and Magnus call their operator customer service to know why that happened.

UC2: Content formatting

Jean-Francois wants to surf on his operator portal. He is going to view a video content but he cannot view the content in the proper way. The perceived quality seems to be low.

UC3: Application porting

Darren wants to use the new gaming service offered by his operator. He goes to the operator portal and surfs on the gaming WAP page. He downloads the application to enables the service. He launches the game but it is not formatted for Darren's terminal screen resolution.

Jarmo downloads an application from his operator site. He launches the application but he cannot read the text of the application because the resized application makes the fonts too small.

6.2 INDUSTRY CASES FOR DISPLAY DE-FRAGMENTATION

UC4: Fragmentation and segmentation

Fabio, an application developer from a telecoms operator, is going to deploy his brand new portal. He has to adapt the portal to a great variety of mobile terminal screen displays. So, he decides to support only some mobile terminals. Fabio's head of marketing is very angry with him: the portal can only be fully used by a small percentage of customers!

UC5: Development costs

Brian, an application developer from a telecoms operator, has to port an application written for terminal 'A' to a new terminal 'B'. He has to rewrite the GUI because 'A' has a different display resolution. He also has to accommodate the capture engine because 'B' has a different camera. After lot of hard work, Brian is very tired but happy to have the application running on 'B'. Brian opens his email client. His boss writes that Brian's application is very interesting but 'A' and 'B' covers only 0.3% of the customers' terminals, so he asks Brian to port the application on terminal 'C','D' ,'E', …'Z', which leads to a development/version nightmare. All the terminals have different screen resolutions and cameras!

UC5: Integration on a terminal

Ingolf, a chip architect, is going to design a new video encoder. He asks for the required quality from Fabio in a telecoms operator service division and designs the chip to meet the requirements. The chip is used in a new cellular terminal in conjunction with a certain camera. The quality is lower than expected. Fabio asks Ingolf "Where is the problem ?"

7 CLASS VALUES

The following sections define some classes for displays. The classes can be used as referred to in section 1.2. To be entitled to be compliant to an OMTP Dx class one display, it SHOULD respect all the listed parameters.

7.1 OMTP DISPLAY CLASSES

In this section, the display classes within OMTP are defined. Please note that all displays are in portrait orientation in this release of the document

7.1.1 DISPLAY OMTP D0

RESOLUTION	128X128
PIXEL ASPECT RATIO	1:1
COLOUR DEPTH	65K
FRAME RATE	10 FPS

7.1.2 DISPLAY OMTP D1

RESOLUTION	128X160
PIXEL ASPECT RATIO	1:1
COLOUR DEPTH	65K
FRAME RATE	15 FPS

7.1.3 DISPLAY OMTP D2

In this class, two resolutions are defined. However, OMTP D3 (see section 7.1.4) is RECOMMENDED for future use (instead of using OMTP D2).

Display OMTP D2.1

RESOLUTION	176X220
PIXEL ASPECT RATIO	1:1
COLOUR DEPTH	65K
FRAME RATE	15 FPS

Display OMTP D2.2

RESOLUTION	176X208
PIXEL ASPECT RATIO	1:1
COLOUR DEPTH	65K
FRAME RATE	15 FPS

It is currently anticipated that option OMTP D2.2 will NOT be RECOMMENDED in future releases of this document.

7.1.4 DISPLAY OMTP D3

RESOLUTION	240X320
PIXEL ASPECT RATIO	1:1
COLOUR DEPTH	262K
FRAME RATE	30 FPS

7.1.5 DISPLAY OMTP D4

RESOLUTION	320X480
PIXEL ASPECT RATIO	1:1
COLOUR DEPTH	262K
FRAME RATE	30 FPS

7.1.6 DISPLAY OMTP D5

RESOLUTION	480X640
PIXEL ASPECT RATIO	1:1
COLOUR DEPTH	262K
FRAME RATE	30 FPS

7.2 FURTHER CLASSES

OMTP will define further classes in subsequent specification releases in order to follow the technology trends and to include more advanced performances for open mobile terminal platforms displays

8 ABBREVIATIONS

ABBREVIATION	DESCRIPTION
OMTP	Open Mobile Terminal Platform
FPS	Frames per second
K	Used in colour depth
QCIF	Quarter Common Intermediate Format [176x144]
VGA	Video Graphics Array
NRE	Nonrecurring engineering charge

9 REFERENCED DOCUMENTS

NO.	DOCUMENT	AUTHOR	DATE
[1]	RFC 2119 - Key words for use in RFCs to Indicate Requirement Levels	IETF documents	March 1997