# COMMITTEE DRAFT

**SMPTE ENGINEERING GUIDELINE**

# Mastering Guideline for Japanese Timed Text DCDMs

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# Foreword

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This document was prepared by Technology Committee 27C.

# Introduction

*This section is entirely informative and does not form an integral part of this Engineering Document.*

The 27C Stereo Subtitling drafting group has found that some subtitle rendering devices, deployed in the field conform to older revisions of SMPTE ST 428-7, but not to the SMPTE ST 428-7: 2014 version (latest version as of the date of publication of this EG). Others have different interpretations of ambiguous portions of the specification. This variance in behavior may cause subtitle characters to be displayed in theaters differently than what was intended during mastering. This has sometimes delayed the adoption of SMPTE compliant DCPs, as has happened in Japan.

This mastering engineering guideline presents some common Japanese use cases with XML examples and intended rendered appearance to minimize the differences among products and various SMPTE ST 428-7 implementations, and to allow broader adoption of SMPTE compliant DCPs and their continued usage with confidence.

# 1    Scope

This engineering guideline provides several XML examples of common Japanese use cases, along with their expected appearance and mastering recommendations to respect as best as possible the intent of the content creator.

# 2    Conformance

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword "reserved" indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword "forbidden" indicates "reserved" and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to this document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

Unless otherwise specified, the order of precedence of the types of normative information in this document shall be as follows: Normative prose shall be the authoritative definition; Tables shall be next; then formal languages; then figures; and then any other language forms.

# 3    Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

*SMPTE ST 428-7*, D-Cinema Distribution Master — Subtitle

# 4    Terms and definitions

For the purposes of this document, the terms and definitions given in the following documents and the additional terms and definitions apply:

- SMPTE ST 428-7

**projection mask**

edge of active area of the picture essence, where the active area is the rectangular region which is intended to be visible to the audience

Note 1 to entry: Active area related information is available through the `MainPictureActiveArea` element as defined in SMPTE ST 429-16.

# 5 Samples of Japanese text and characters

## 5.1 Vertical text

Vertical text corresponds to text that is vertically rendered, as shown in Figure 1, and specified using a `Direction` attribute value of "ttb" or "btt" as defined in SMPTE ST 428-7. The vertical text is used when the subtitle can't be placed at the bottom of the primary picture as horizontal text due to possible overlap with the other on-screen texts, or because of director/translator intent.
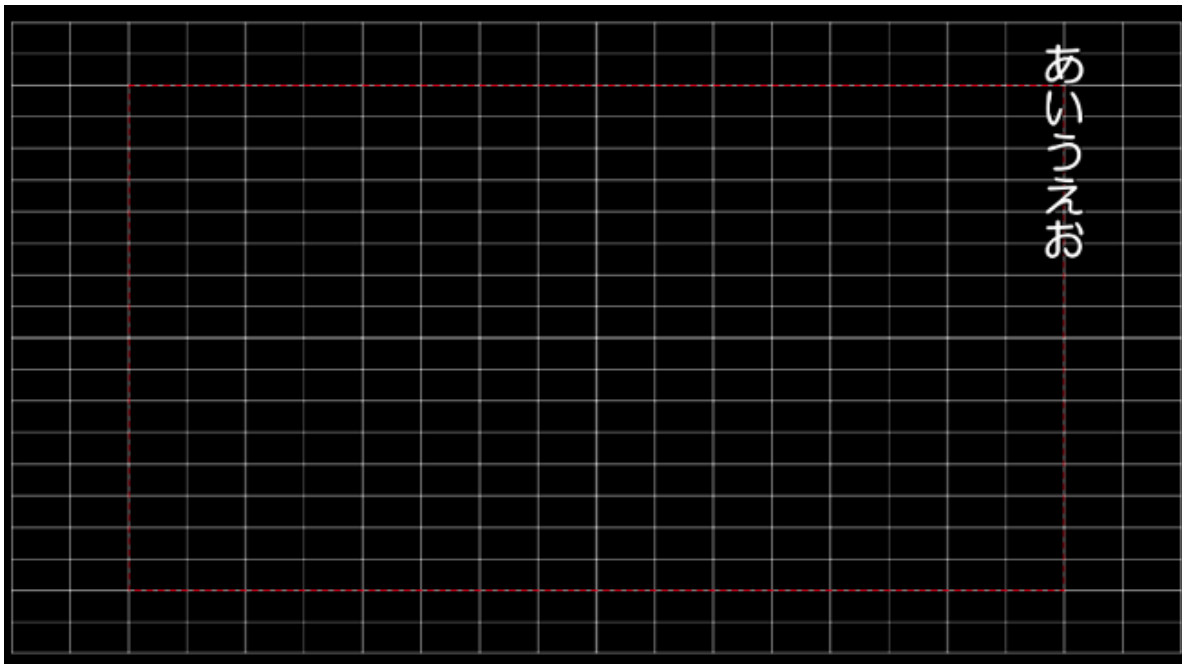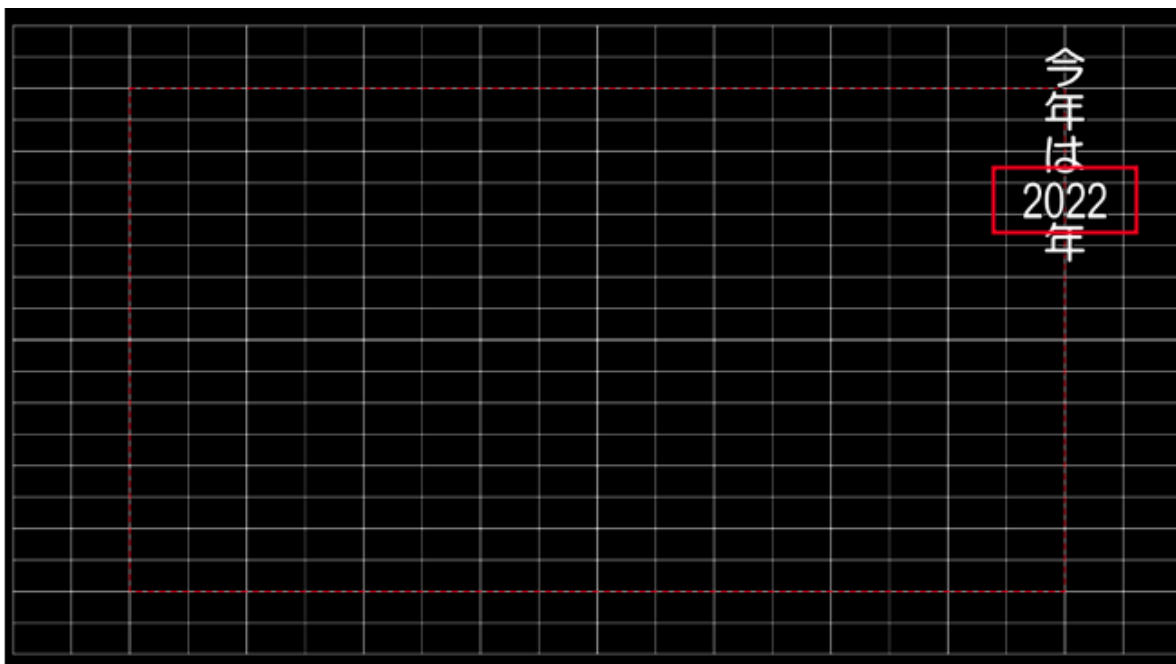


**Figure 1 – Vertical Text Sample**

## 5.2 TateChuYoko

In vertical text, the TateChuYoko places numbers side-by-side instead of vertical stacking for easier reading, as shown in Figure 2. In general, it uses up to four digits.

**Figure 2 – TateChuYoko Sample**

## 5.3 Chidori-style

The Chidori-style is used for song lyrics. It shifts the beginning of the first and second lines by placing space characters at the end of the first line and space characters at the beginning of the second line, as shown in Figure 3.
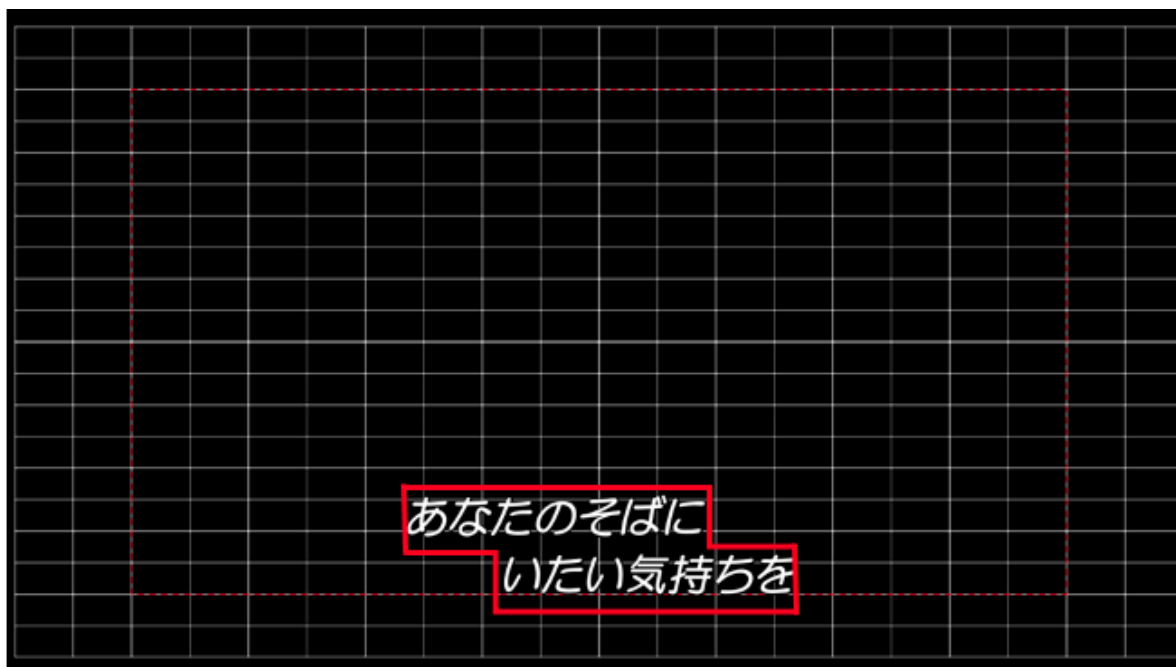


**Figure 3 – Chidori-style Sample**

**5.4    Yōon**

These twenty characters are smaller versions of Japanese characters that are used when a mora is formed with palatalization or labialization.

EXAMPLE — The Hiragana letter "ぁ" is a Yōon. It is the smaller version of the same Hiragana letter "あ" , as shown in Figure 4.
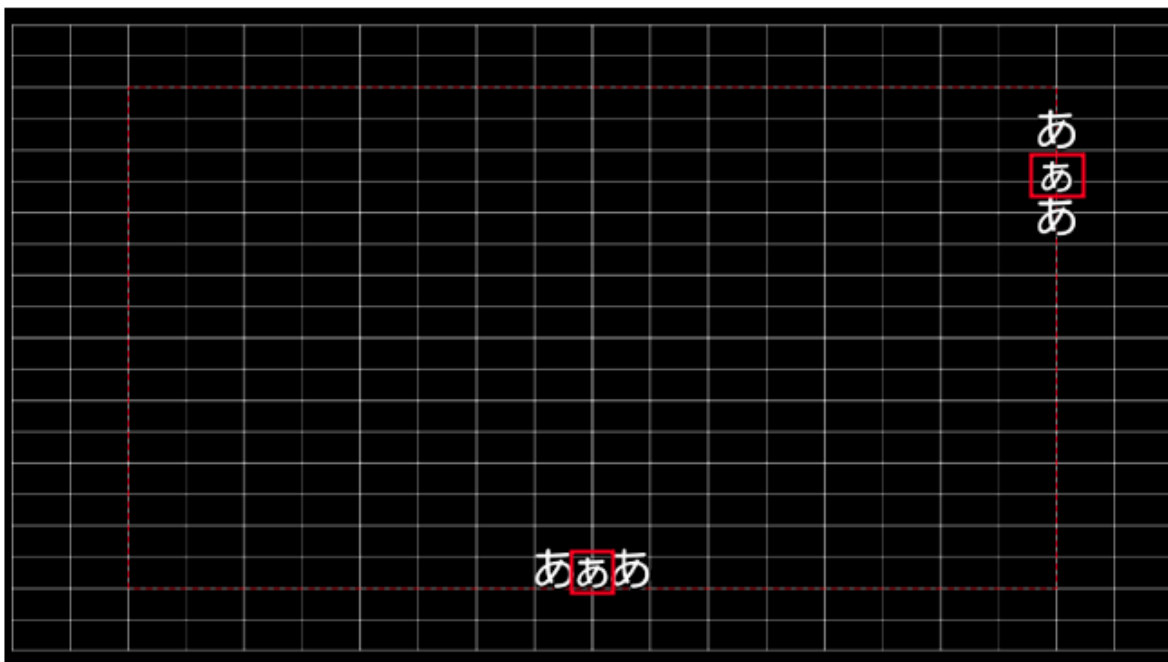


**Figure 4 – Yōon Sample**

**5.5    Sokuon**

These two characters are smaller versions of Japanese characters that are used to mark a geminate consonant.

EXAMPLE — Hiragana letter "っ" is a Sokuon. It is the smaller version of the same Hiragana letter "つ" , as shown in Figure 5.

**Figure 5 – <u>Sokuon</u> Sample**

# 6  XML examples and typical Japanese rendering results

## 6.1  Vertical Positioning of Vertical Text

### 6.1.1  Background

Section 6.3.4 of <u>SMPTE ST 428-7: 2014</u> states, "When present, the `Vposition` attribute shall specify the distance of the text's baseline from the edge or the center of the primary picture." This requirement differs from prior versions of <u>SMPTE ST 428-7</u>, leading to different subtitle vertical positions, especially in the case of <u>vertical text</u>. This may cause subtitle character(s) to unexpectedly be positioned outside of the primary picture, and therefore partially or entirely hidden by the <u>projection mask</u>.

EXAMPLE — The top subtitle character may be hidden partially when the `Vposition` value is not enough with `Valign="top"`, as shown in <u>Figure 6</u>. And a long subtitle character chain may also be truncated at the bottom edge of the primary picture.
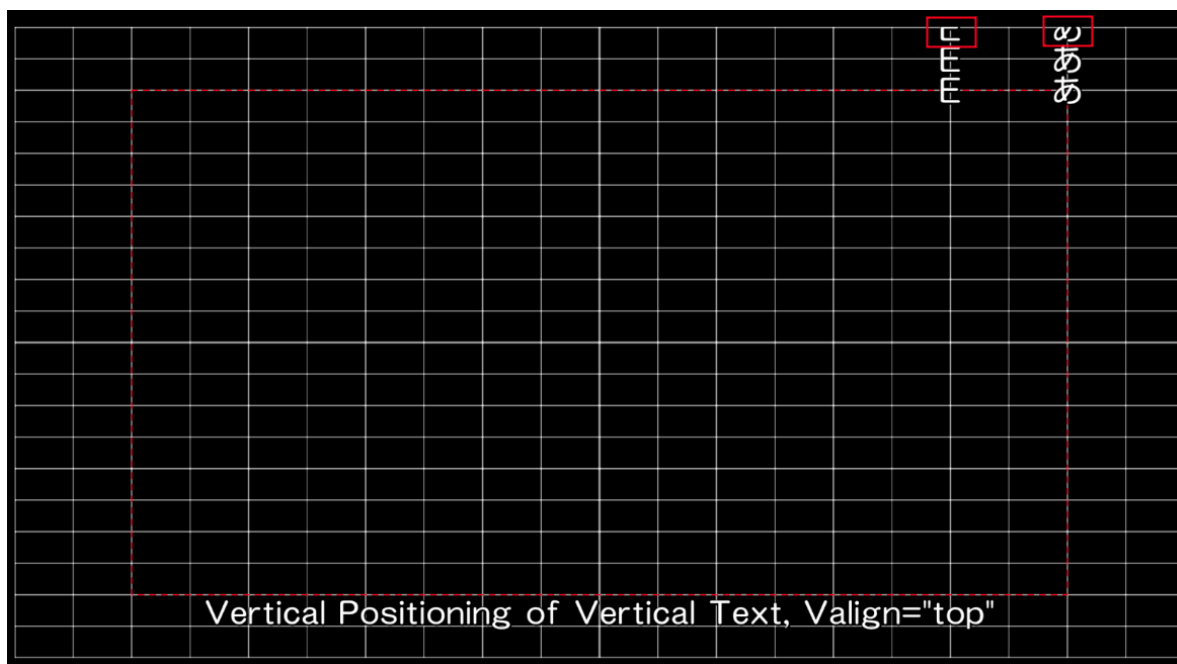
**Figure 6 – Example of subtitle characters partially hidden by <u>projection mask</u>**

### 6.1.2    Subtitles vertical positioning when using `Valign="top"`

When defining subtitles' vertical positioning using `Valign="top"`, to choose a position that is expected to work on all rendering systems it is recommended to take into account that the exact subtitle position may vary by one character's "Ascent" height depending on the <u>SMPTE ST 428-7</u> version implemented.

The example below illustrates results obtained by the implementation of different <u>SMPTE ST 428-7</u> versions.

EXAMPLE —

XML excerpt containing `Vposition` values specified by content creator expecting compliance with <u>SMPTE ST 428-7: 2014</u>:

```
<Text Direction="ttb" Halign="right" Hposition="10.00" Valign="top" Vposition="20.00" Zposition="0.00">あああ
</Text>
<Text Direction="ttb" Halign="right" Hposition="20.00" Valign="top" Vposition="20.00" Zposition="0.00">E E E
</Text>
<Text Direction="ltr" Halign="center" Hposition="0.00" Valign="bottom" Vposition="5.00"
Zposition="0.00">Vertical Positioning of Vertical Text, Valign="top"</Text>
```

is expected to produce a rendering as shown in <u>Figure 7</u>,
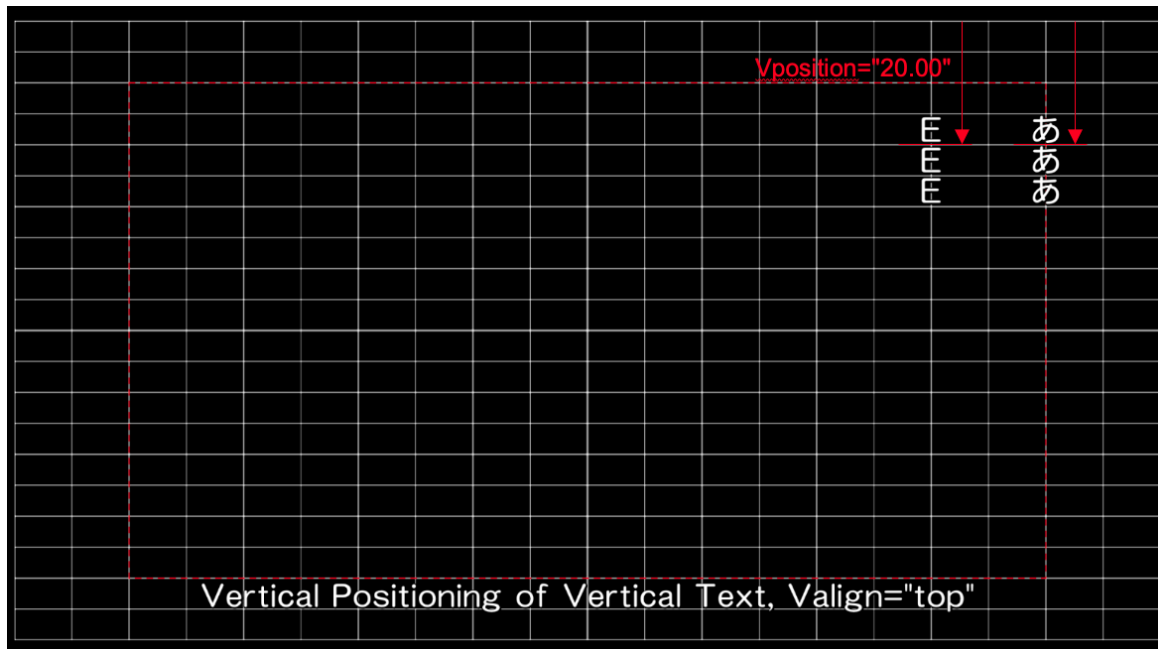
**Figure 7 – Desired Vertical Positioning of <u>Vertical Text</u> Sample**

and is NOT expected to produce a rendering as shown in <u>Figure 8</u> (which is based on the bounding box, "from the side of the primary picture's frame," as specified in <u>SMPTE ST 428-7: 2010</u>).
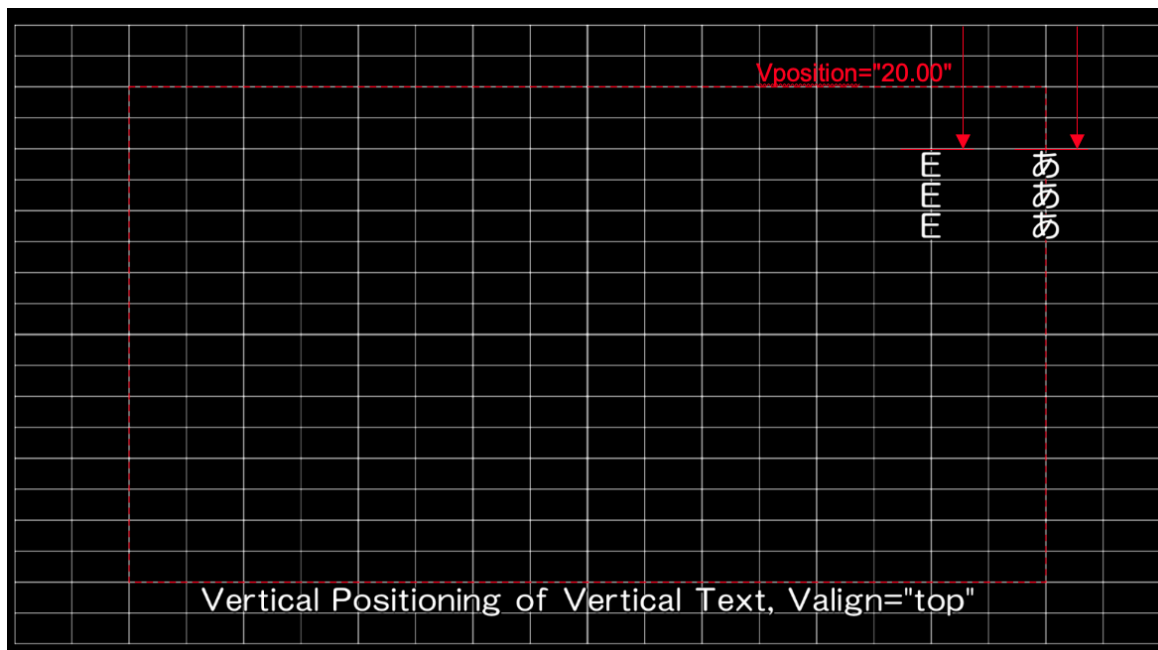


**Figure 8 – Undesired Vertical Positioning of <u>Vertical Text</u>**

### 6.1.3    Subtitles vertical positioning when using `Valign="bottom"`

An option to minimize the vertical positioning gap between different <u>SMPTE ST 428-7</u> versions is to use `Valign="bottom"` instead of `Valign="top"`. The gap is Descent height in case of `Valign="bottom"`, and is Ascent height in case of
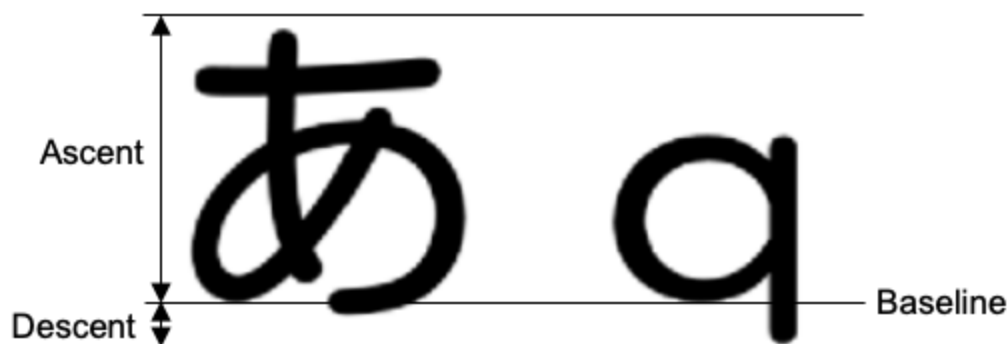
`Valign="top"` as shown in Figure 9.



**Figure 9 – Ascent vs Descent Distance Illustration**

EXAMPLE 1 —

XML essence containing `Valign="bottom"` and `Vposition` values used to illustrate the positioning difference between SMPTE ST 428-7: 2014 and SMPTE ST 428-7: 2010, as shown in Figure 10, Figure 11, and Figure 12:

```
<Text Direction="ttb" Halign="right" Hposition="10.00" Valign="bottom" Vposition="70.00" Zposition="0.00">q q q
</Text>
<Text Direction="ttb" Halign="right" Hposition="20.00" Valign="bottom" Vposition="70.00" Zposition="0.00">あああ
</Text>
<Text Direction="ltr" Halign="center" Hposition="0.00" Valign="bottom" Vposition="5.00"
Zposition="0.00">Vertical Positioning of Vertical Text, Valign="bottom"</Text>
```
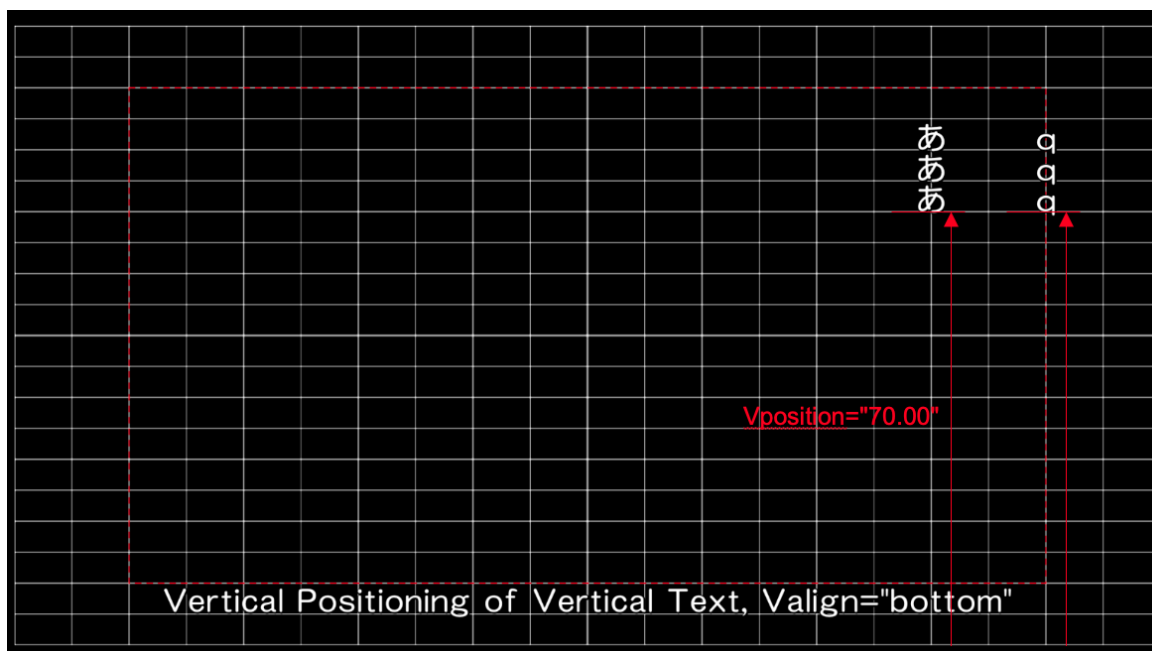


**Figure 10 – Example of Vertical Positioning of Vertical Text with `Valign="bottom"` and compliance with SMPTE ST 428-7: 2014**
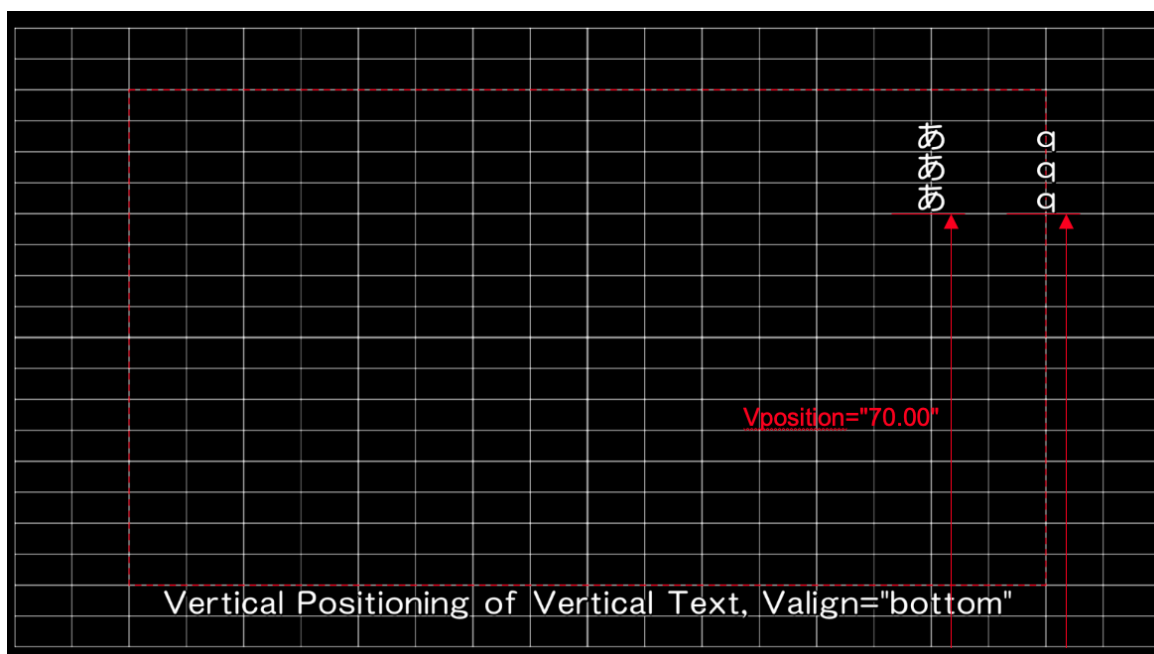
**Figure 11 – Example of Vertical Positioning of Vertical Text with `Valign="bottom"` and compliance with SMPTE ST 428-7: 2010**
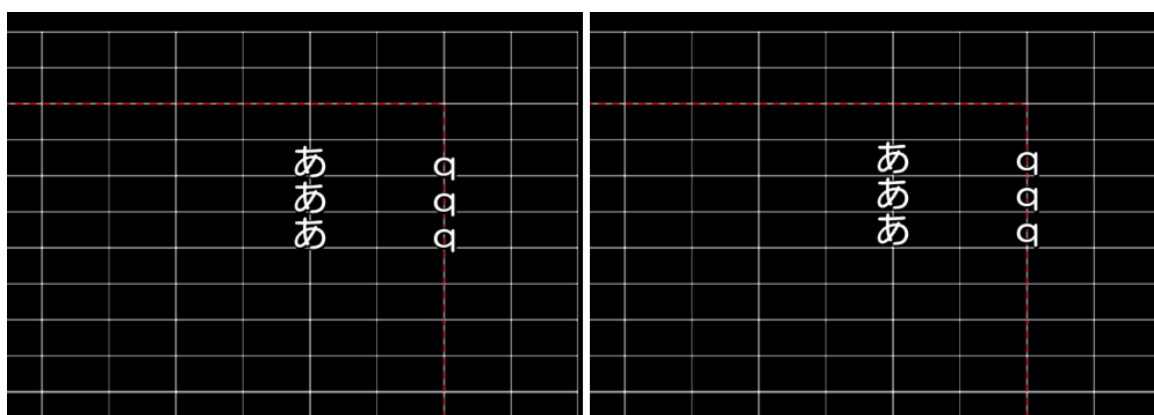


**Figure 12 – Example of Vertical Positioning of Vertical Text with `Valign="bottom"` and compliance with SMPTE ST 428-7: 2014 (Left) vs SMPTE ST 428-7: 2010 (Right)**

EXAMPLE 2 —

XML essence containing `Valign="top"` and `Vposition` values used to illustrate the positioning difference between SMPTE ST 428-7: 2014 and SMPTE ST 428-7: 2010, as shown in Figure 13, Figure 14, and Figure 15:

```
<Text Direction="ttb" Halign="right" Hposition="10.00" Valign="top" Vposition="20.00" Zposition="0.00">q q q
</Text>
<Text Direction="ttb" Halign="right" Hposition="20.00" Valign="top" Vposition="20.00" Zposition="0.00">あああ
</Text>
<Text Direction="ltr" Halign="center" Hposition="0.00" Valign="bottom" Vposition="5.00"
Zposition="0.00">Vertical Positioning of Vertical Text, Valign="top"</Text>
```
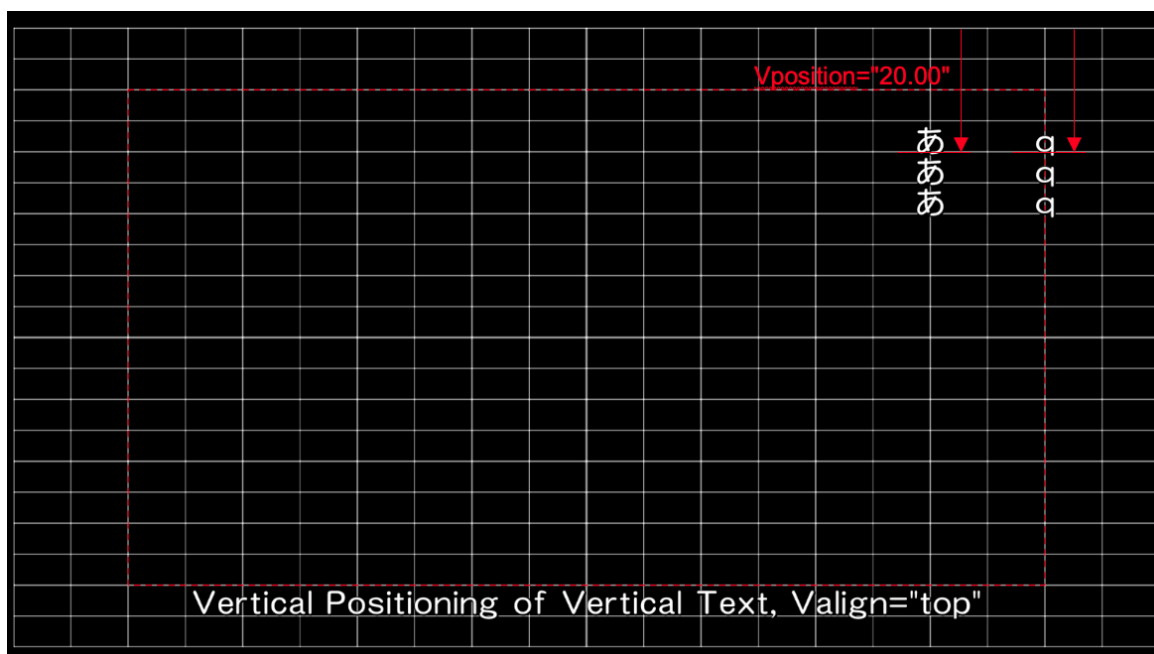
**Figure 13 – Example of Vertical Positioning of Vertical Text with `Valign="top"` and compliance with <u>SMPTE ST 428-7: 2014</u>**
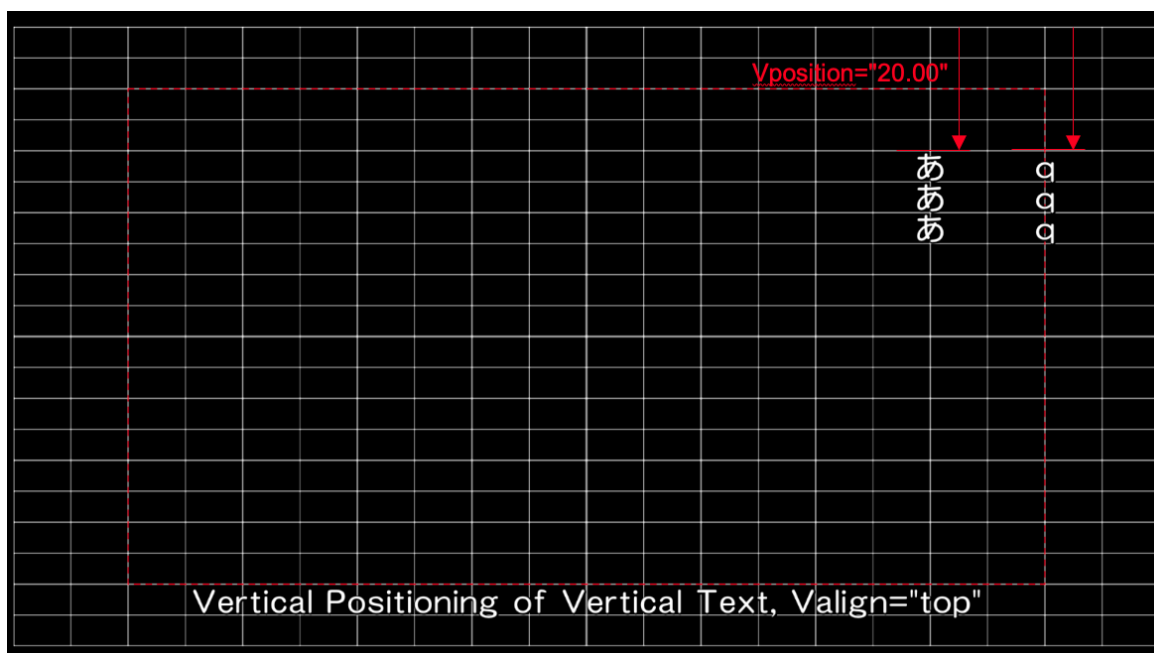


**Figure 14 – Example of Vertical Positioning of Vertical Text with `Valign="top"` and compliance with <u>SMPTE ST 428-7: 2010</u>**
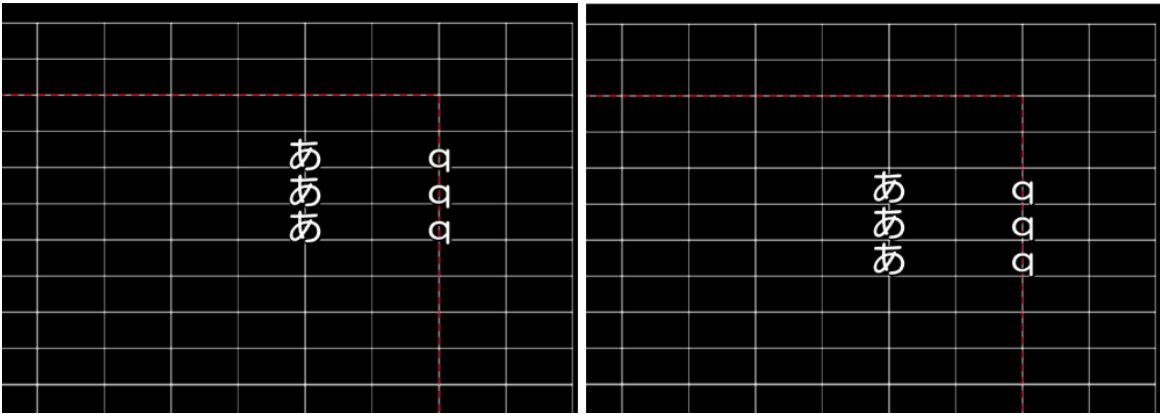
**Figure 15 – Example of Vertical Positioning of Vertical Text with `Valign="top"` and compliance with SMPTE ST 428-7: 2014 (Left) vs SMPTE ST 428-7: 2010 (Right)**

However, using `Valign="bottom"` could result in top characters of two vertical subtitle character strings to be slightly mis-aligned, especially when characters listed in Table 1 are used.

**Table 1 – Characters which could result in top characters of two vertical subtitle character strings to be slightly mis-aligned**

| Name | Unicode | Image |
|---|---|---|
| Left Double Quotation Mark | U+201C | " |
| Right Double Quotation Mark | U+201D | " |
| Comma: Presentation Form For Vertical Ideographic Comma | U+FE11 | 、 |
| Yōon: Hiragana Letter Small A | U+3041 | ぁ |
| Yōon: Hiragana Letter Small I | U+3043 | ぃ |
| Yōon: Hiragana Letter Small U | U+3045 | ぅ |
| Yōon: Hiragana Letter Small E | U+3047 | ぇ |
| Yōon: Hiragana Letter Small O | U+3049 | ぉ |
| Yōon: Hiragana Letter Small Ya | U+3083 | ゃ |
| Yōon: Hiragana Letter Small Yu | U+3085 | ゅ |
| Yōon: Hiragana Letter Small Yo | U+3087 | ょ |
| Yōon: Hiragana Letter Small Wa | U+308E | ゎ |
| Yōon: Katakana Letter Small A | U+30A1 | ァ |

| | | |
|---|---|---|
| Yōon:<br>Katakana Letter Small I | U+30A3 | ィ |
| Yōon:<br>Katakana Letter Small U | U+30A5 | ゥ |
| Yōon:<br>Katakana Letter Small E | U+30A7 | ェ |
| Yōon:<br>Katakana Letter Small O | U+30A9 | ォ |
| Yōon:<br>Katakana Letter Small Ya | U+30E3 | ャ |
| Yōon:<br>Katakana Letter Small Yu | U+30E5 | ュ |
| Yōon:<br>Katakana Letter Small Yo | U+30E7 | ョ |
| Yōon:<br>Katakana Letter Small Wa | U+30EE | ヮ |
| Yōon:<br>Katakana Letter Small Ka | U+30F5 | ヵ |
| Yōon:<br>Katakana Letter Small Ke | U+30F6 | ヶ |
| Sokuon:<br>Hiragana Letter Small Tu | U+3063 | っ |
| Sokuon:<br>Katakana Letter Small Tu | U+30C3 | ッ |

Also, as the rendering order will be bottom to top when `Valign="bottom"`, it may result in making characters appear one after the other from bottom to top, as shown in Figure 16, which is very unnatural to the audience even if the display speed is fast.
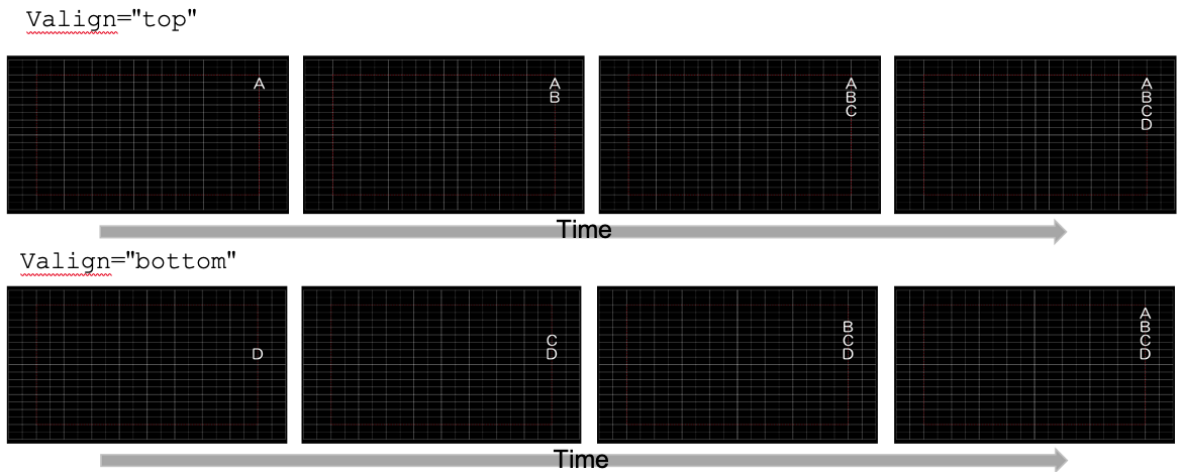


**Figure 16 – Difference of rendering order**

## 6.2       Vertical Text Intercharacter Spacing

Improper intercharacter spacing affects readability. In vertical text particularly, the intercharacter spacing for a very narrow character like "一" (U+4E00) may vary if vertical metrics do not render properly. There are several possible causes, for example, the renderer does not support vertical metrics, vertical metrics were removed during typeface subsetting before making a DCP, or a typeface itself does not include vertical metrics. The use of TateChuYoko in in `HGroup` elements may often cause characters to overlap, especially when italic characters are used.

When using such characters, it is necessary to consider the vertical spacing between characters. For example, for better intercharacter spacing it is recommended to specify each of these possibly mis-handled characters using a dedicated `Text` element and its own `Vposition` and `Hposition` specific values in the XML file to avoid collision with characters positioned above or below them. It's not recommended to use Ideographic Space characters (U+3000), Space characters (U+0020), or the Space element for the intercharacter spacing due to uncertain appearance.

EXAMPLE 1 —

XML file with "一" character, `HGroup` elements and `Italic` attribute:

```
<Text Direction="ttb" Halign="right" Hposition="10.00" Valign="top"
Vposition="20.00" Zposition="0.00">国一国 E 一 E <HGroup>1234</HGroup>国</Text>
<Font Italic="yes">
<Text Direction="ttb" Halign="right" Hposition="20.00" Valign="top" Vposition="20.00" Zposition="0.00">国一国 E 一
 E <HGroup>1234</HGroup>国</Text>
</Font>
<Text Direction="ltr" Halign="center" Hposition="0.00" Valign="bottom" Vposition="5.00"
Zposition="0.00">Vertical Intercharacter Spacing</Text>
```
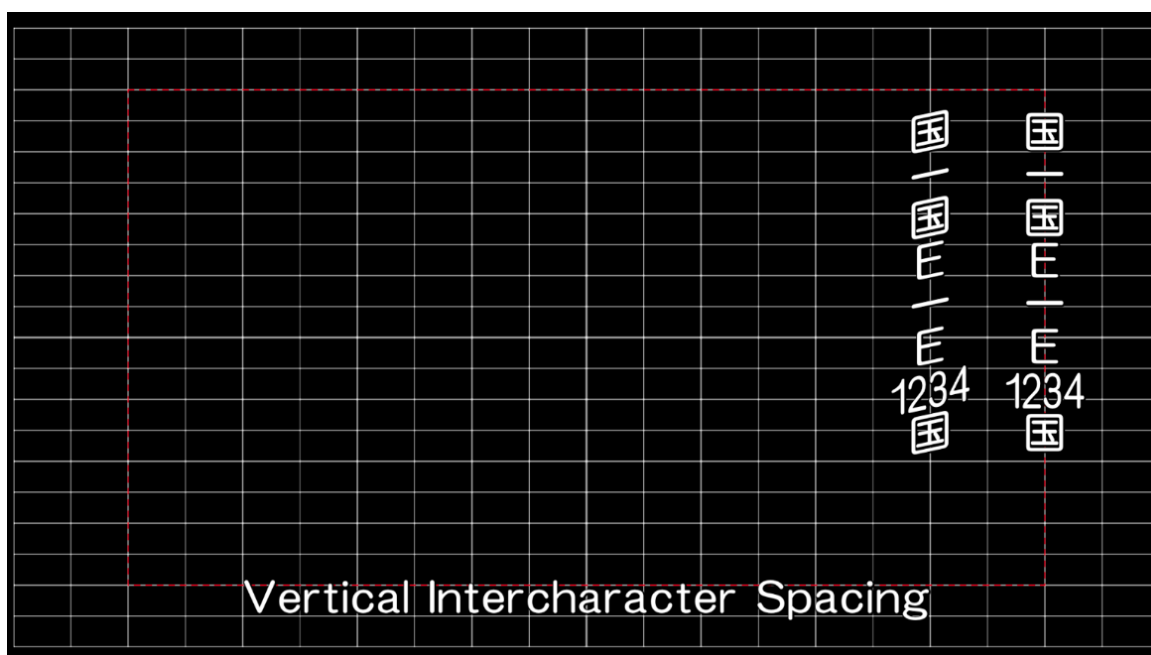
is expected to produce a rendering as shown in Figure 17,



**Figure 17 – Desired Vertical Text Intercharacter Spacing Sample**

and is NOT expected to produce a rendering as shown in Figure 18.

**Figure 18 – Undesired Vertical Text Intercharacter Spacing Sample**

To achieve the same appearance as shown in Figure 17, specify the `Vposition` values of the character "一" (U+4E00) and each character (or group of characters) before and after it using dedicated `Text` elements.

EXAMPLE 2 —

XML file with a dedicated `Text` element for each charcter associated with a `Direction` attribute value equal to "ttb" or "btt":

```
<Text Direction="ttb" Halign="right" Hposition="10.00" Valign="top" Vposition="20.00" Zposition="0.00">国</Text>
<Text Direction="ttb" Halign="right" Hposition="10.00" Valign="top" Vposition="26.94" Zposition="0.00">一</Text>
<Text Direction="ttb" Halign="right" Hposition="10.00" Valign="top" Vposition="33.88" Zposition="0.00">国 E
</Text>
<Text Direction="ttb" Halign="right" Hposition="10.00" Valign="top" Vposition="47.82" Zposition="0.00">一</Text>
<Text Direction="ttb" Halign="right" Hposition="10.00" Valign="top" Vposition="54.76" Zposition="0.00">E
<HGroup>1234</HGroup>国</Text>
<Font Italic="yes">
<Text Direction="ttb" Halign="right" Hposition="20.00" Valign="top" Vposition="20.00" Zposition="0.00">国</Text>
<Text Direction="ttb" Halign="right" Hposition="20.00" Valign="top" Vposition="26.94" Zposition="0.00">一</Text>
<Text Direction="ttb" Halign="right" Hposition="20.00" Valign="top" Vposition="33.88" Zposition="0.00">国 E
</Text>
<Text Direction="ttb" Halign="right" Hposition="20.00" Valign="top" Vposition="47.82" Zposition="0.00">一</Text>
<Text Direction="ttb" Halign="right" Hposition="20.00" Valign="top" Vposition="54.76" Zposition="0.00">E
<HGroup>1234</HGroup>国</Text>
</Font>
<Text Direction="ltr" Halign="center" Hposition="0.00" Valign="bottom" Vposition="5.00"
Zposition="0.00">Vertical Intercharacter Spacing</Text>
```

## 6.3    Spacing for Chidori-style

The horizontal positioning is based on the bounding box. Neither leading Ideographic Space (U+3000) and Space (U+0020) characters nor the `Space` element might increase the size of the bounding box as required to shift the text to the right. It recommended to use a different `Hposition` for each line of Chidori-style instead.

EXAMPLE —

XML file with different `Hposition` values for each line of Chidori-style:

```
<Font Italic="yes">
<Text Direction="ltr" Halign="center" Hposition="-4.00" Valign="bottom" Vposition="19.10" Zposition="0.00">あなた
のそばに</Text>
<Text Direction="ltr" Halign="center" Hposition="4.00" Valign="bottom" Vposition="10.00" Zposition="0.00">いたい気
持ちを</Text>
</Font>
```

is expected to produce a rendering as shown in Figure 19,



**Figure 19 – Desired Spacing for Chidori-style**

# Bibliography

*SMPTE ST 429-16*, D-Cinema Packaging — Additional Composition Metadata and Guidelines

*SMPTE ST 428-7: 2010*, D-Cinema Distribution Master — Subtitle

*SMPTE ST 428-7: 2014*, D-Cinema Distribution Master — Subtitle