

Universal Multiple-Octet Coded Character Set
International Organization for Standardization
Organisation Internationale de Normalisation
Международная организация по стандартизации

Doc Type: Working Group Document**Title: Proposal for a revised Tangut character set for encoding in the SMP of the UCS****Source: Michael Everson, Nathan Hill, Guillaume Jacques, Andrew West, Viacheslav Zaytsev****Status: Individual Contribution****Action: For consideration by JTC1/SC2/WG2 and UTC****Date: 2009-04-08**

1. Introduction. This is a proposal to replace the set of Tangut characters under ballot on Amd.7 with an extended and consistently ordered set of characters. Extensive discussion with Tangutologists from China, France, Japan, Russia, the UK, and the USA has indicated that the current set of 5,910 characters does not meet the requirements of the user community. In particular Tangut users need to be able to represent all graphically distinct Tangut characters that are used in modern dictionaries and scholarly works, which the character repertoire under ballot does not allow. The set of 6,221 Tangut characters that we are proposing includes all graphically distinct characters used in Kyčanov 2006, Lǐ Fànwén 1997/2008 and Hán Xiǎománg 2004.

Previous documents on Tangut included:

N3297 *Proposal to encode Tangut characters in UCS Plane 1*. Richard Cook (UC Berkeley Script Encoding Initiative), 2007-05-09

N3307 *Tangut Background*. Richard Cook (UC Berkeley Script Encoding Initiative), 2007-09-01

N3338 *Response to UC Berkeley's proposals on Tangut*. China NB, 2007-09-16

N3343 *Expert feedback on Chinese NB input on WG2/N3297 Tangut Encoding Proposal*. Richard Cook, 2007-09-17

N3448 *Comments on N3297: Proposal to encode Tangut characters in UCS Plane 1 and Charts*. UK NB, 2008-04-19

N3467 *Comments on N3297: Proposal to encode Tangut characters in UCS Plane 1 and charts*. China and US NBs, 2008-04-22

N3495 *Proposal to encode Tangut Radicals and CJK Strokes in the UCS*. Michael Everson and Andrew West, 2008-09-01

N3496 *Review of Proposed Tangut Repertoire*. UK NB, 2008-09-01 (revised 2008-09-07)

N3498 *Expert Feedback on the proposed Tangut character set in PDAM 6.2*. Michael Everson and Andrew West, 2008-09-24

N3521 *The UCS Tangut Repertory*. Richard Cook and Ken Lunde, 2008-10-10

N3539 *Response from Tangut scholars of China on the Tangut Unicode proposal*. China NB, 2008-10-13

N3541 *Report from the Ad Hoc on Tangut*. Erkki I. Kolehmainen, 2008-10-13

N3577 *Proposal for a revised Tangut character set for encoding in the SMP of the UCS*. Michael Everson, Nathan Hill, Guillaume Jacques, Andrew West, Viacheslav Zaytsev, 2009-03-01

N3586 *Request for Tangut font and mappings from N3577 to Amendment 7 repertoire*. Deborah Anderson and Richard Cook, 2009-03-04

Table 1: WG2 Documents relating to Tangut

2. Character Repertoire. Extensive discussion with Tangutologists from China, France, Japan, Russia, the UK and the USA has indicated that the user community needs to be able to represent all graphically distinct Tangut characters that are used contrastively in modern dictionaries and scholarly works, even when they are variant character forms or erroneous character forms. Due to the complex structure of individual Tangut characters, and the fact that many characters are confusingly similar to other characters, Tangutologists are particularly concerned with the structural composition of characters, and need to be able to precisely represent the particular character under discussion. Thus the user community is not in favour of extensive unification of character variants. In addition, as Tangut is not a fully deciphered script, there may be disagreement amongst experts as to whether two similar character forms are simple glyph variants of the same character or whether they are semantically distinct characters. We believe that it is safest to err on the side of caution, and separately encode all characters that are used contrastively in contemporary and modern sources. This is in accord with the opinion expressed by Chinese Tangut experts in N3539.

The set of 6,221 Tangut characters proposed in this document includes all graphically distinct characters used in Kyčanov 2006, Lǐ Fànwén 1997/2008 and Hán Xiǎománg 2004. Although this does not cover all possible variant forms of Tangut characters that can be found in contemporary printed material, manuscripts and inscriptions, it does cover almost all of the characters that are used in modern Tangut scholarship, and we believe that it is a satisfactory basic set of Tangut characters. However, it is possible that further characters may need to be encoded at a future date.

3. Ordering Principles. It is essential to have a clearly defined system of character ordering for a large character set such as Tangut, both to facilitate the lookup of characters by users as well as to ensure that any additions to the character repertoire made during the encoding process can be correctly interpolated into the original set of characters. These ordering principles will be applied to the forthcoming revision of our Tangut radicals proposal, and may also be used for any future Tangut extension block.

Although almost all modern Tangut dictionaries and glossaries order characters by radical and stroke count, there is considerable variation in the set of radicals used as a basis for ordering, and so there is no universally accepted or standard character ordering system for Tangut. Most authors (e.g. Nishida, Sofronov, Shǐ Jīnbō, Lǐ Fànwén, and Hán Xiǎománg) choose the leftmost structural element of a character as its radical where possible, and the top, bottom or surrounding element if not; but some authors (e.g. Grinstead, Kolokolov and Kyčanov) choose the structural element at the bottom right of a character as its radical. Although both systems have their relative merits, we have decided to use a radical system based on the leftmost structural element as the basis for ordering the proposed character repertoire. The ordering principles described here are based on those used in Hán Xiǎománg 2004, with some modifications where necessary, and applied consistently to the entire set of characters.

The determination of radicals and the definition of stroke count and stroke ordering is necessarily a somewhat arbitrary task, but by following a clearly defined set of ordering principles we have aimed to produce a consistent and deterministic system of ordering for Tangut characters.

The following principles have been used to determine what radical a character is ordered under:

- the leftmost element or group of elements is chosen as the radical where possible (such as, for example, 彡 for 彡, and 彡 for 彡)
- where a character does not have an element or group of elements on the left side, the top, bottom or enclosing element is chosen as the radical (for example, 彡 for 彡, 彡 for 彡, and 彡 for 彡)
- where a character has both a top and bottom element (but no left side element), the top element is chosen as the radical (e.g. 彡 for 彡)
- characters that occur as a left side radical are ordered with the characters that use it as a radical, even if the character itself could be more naturally ordered under a different radical (for example, the

character 𪛗 is ordered together with the character 𪛘 under the radical 𪛙, rather than under the radical 𪛚)

- if the same radical shape occurs in different positions they are treated as separate radicals (e.g. 𪛛 and 𪛜 are treated as separate radicals, and 𪛝 and 𪛞 are treated as separate radicals)
- left side radicals and left-and-under radicals with the same basic glyph shape are treated as separate radicals (for example, 𪛟 and 𪛠 are treated as separate radicals, and 𪛡 and 𪛢 are treated as separate radicals).

Based on these principles we have identified a set of 527 radicals that can be used to order the proposed set of characters (note that these are only a subset of the radicals that are required to be encoded in order to cover different systems of radical classification). The relative ordering of these radicals, as well the ordering of characters within the same radical, is based on the nominal stroke count and stroke order of the character. We have identified eighteen basic stroke types used for Tangut characters, as shown in Table 2, each of which we assign a letter “A” through “R”.

Table 2: Tangut Strokes

| Stroke ID | Typical Stroke | Example Radicals |
|-----------|----------------|------------------|
| A | 一 | 二 卅 丰 |
| B | 丨 | 𪛛 丰 |
| C | 丿 | 𪛜 𪛝 𪛞 |
| D | 丶 | 𪛟 𪛠 𪛡 𪛢 |
| E | ㇀ ㇁ | 𪛛 𪛜 |
| F | フ | 𪛝 𪛞 𪛟 |
| G | 𠃊 | 𪛟 |
| H | 𠃋 | 𪛟 |
| I | 𠃌 | 𪛟 |
| J | 𠃍 | 𪛟 𪛠 |
| K | 𠃎 | 𪛟 𪛠 𪛡 |
| L | ㇂ | 𪛟 𪛠 |
| M | し | 𪛟 𪛠 |
| N | ㇃ | 𪛟 |
| O | 𠃏 | 𪛟 𪛠 |
| P | 𠃐 | 𪛟 𪛠 |
| Q | ㇄ | 𪛟 𪛠 |
| R | ㇅ | 𪛟 𪛠 |

An alphabetic sort key is constructed for each radical from the letters corresponding to its constituent strokes. The order of letters in the sort key is based on the nominal order in which the strokes of the character should be written. Thus the radical 𪛗 is given a sort key of DCBOE based on the nominal writing order of its five constituent strokes. Note that although it is possible to reconstruct the stroke order of Tangut characters to a certain extent by analogy with the stroke order used for writing Han ideographs, some Tangut stroke constructions are unlike anything found in Chinese, and different scholars have different opinions as to what their correct stroke order should be, and even whether a stroke is a single stroke or two conjoined strokes. Although there may not be universal agreement on our

definition of stroke count and stroke order in all cases, we have attempted to be completely consistent, so that the same stroke construction always has the same alphabetic sort key wherever it occurs.

Radicals are ordered by their alphabetic sort key. Where two or more radicals have the same sort key the following principles are applied:

- left side radicals are ordered before top radicals with the same glyph shape (e.g. 𠄎 DCFABBB is ordered before 𠄏 DCFABBB)
- top radicals are ordered before bottom radicals with the same glyph shape (e.g. 𠄐 ABBB is ordered before 𠄑 ABBB)
- radicals with a final long slanting stroke are ordered immediately after the similar radical with a short slanting slope (e.g. 𠄒 CCCQ is ordered immediately after 𠄓 CCCQ)
- radicals with a stroke bending to the right are ordered immediately after the similar radical with a stroke that does not bend to the right (e.g. 𠄔 DCBE is ordered immediately after 𠄕 DCBE)
- radicals with crossing strokes are ordered after characters with non-crossing strokes (e.g. 𠄖 EAAAB is ordered after 𠄗 EAAAB, and 𠄘 EABEAA is ordered after 𠄙 EABEAA which is ordered after 𠄚 EABEAA)

Using these principles we order the 527 radicals as shown in Table 3.

Table 3 : Tangut Radicals used for Character Ordering

| Number | Radical | Strokes | Stroke Order |
|--------|---------|---------|--------------|
| 1 | 一 | 1 | A |
| 2 | 丨 | 1 | B |
| 3 | 丿 | 1 | C |
| 4 | ㇇ | 1 | F |
| 5 | 丶 | 1 | O |
| 6 | 二 | 2 | AA |
| 7 | 𠄎 | 2 | AB |
| 8 | 𠄏 | 2 | BB |
| 9 | 𠄐 | 2 | BE |
| 10 | 𠄑 | 2 | BE |
| 11 | 𠄒 | 2 | CB |
| 12 | 𠄓 | 2 | DA |
| 13 | 𠄔 | 2 | DC |
| 14 | 𠄕 | 2 | EA |
| 15 | 𠄖 | 2 | HO |
| 16 | 𠄗 | 2 | JC |
| 17 | 𠄘 | 2 | NB |
| 18 | 𠄙 | 2 | OF |
| 19 | 𠄚 | 2 | OG |
| 20 | 𠄛 | 3 | AAB |
| 21 | 𠄜 | 3 | AAB |
| 22 | 𠄝 | 3 | AAM |

| Number | Radical | Strokes | Stroke Order |
|--------|---------|---------|--------------|
| 23 | ㇀ | 3 | ABA |
| 24 | ㇁ | 3 | ABB |
| 25 | ㇂ | 3 | ABB |
| 26 | ㇃ | 3 | ABE |
| 27 | ㇄ | 3 | ABO |
| 28 | ㇅ | 3 | ABR |
| 29 | ㇆ | 3 | AJC |
| 30 | ㇇ | 3 | BAA |
| 31 | ㇈ | 3 | BAE |
| 32 | ㇉ | 3 | BEB |
| 33 | ㇊ | 3 | CBB |
| 34 | ㇋ | 3 | CCC |
| 35 | ㇌ | 3 | CCQ |
| 36 | ㇍ | 3 | CCQ |
| 37 | ㇎ | 3 | CCQ |
| 38 | ㇏ | 3 | DAB |
| 39 | ㇐ | 3 | DAB |
| 40 | ㇑ | 3 | DCA |
| 41 | ㇒ | 3 | DCB |
| 42 | ㇓ | 3 | DCB |
| 43 | ㇔ | 3 | DDC |
| 44 | ㇕ | 3 | EAA |
| 45 | ㇖ | 3 | EAG |
| 46 | ㇗ | 3 | FBA |
| 47 | ㇘ | 3 | FBB |
| 48 | ㇙ | 3 | FCB |
| 49 | ㇚ | 3 | FCQ |
| 50 | ㇛ | 3 | HAB |
| 51 | ㇜ | 3 | HBB |
| 52 | ㇝ | 3 | KDD |
| 53 | ㇞ | 3 | LBO |
| 54 | ㇟ | 3 | OFB |
| 55 | ㇠ | 4 | AAAB |
| 56 | ㇡ | 4 | AABB |
| 57 | ㇢ | 4 | AABB |
| 58 | ㇣ | 4 | AABE |
| 59 | ㇤ | 4 | AAJC |
| 60 | ㇥ | 4 | ABBB |
| 61 | ㇦ | 4 | ABBB |

| Number | Radical | Strokes | Stroke Order |
|--------|---------|---------|--------------|
| 62 | 𠄎 | 4 | ABEA |
| 63 | 𠄏 | 4 | ABEB |
| 64 | 𠄐 | 4 | ABFQ |
| 65 | 𠄑 | 4 | ACCQ |
| 66 | 𠄒 | 4 | AFCQ |
| 67 | 𠄓 | 4 | AKDD |
| 68 | 𠄔 | 4 | BAAE |
| 69 | 𠄕 | 4 | BAEA |
| 70 | 𠄖 | 4 | BBAE |
| 71 | 𠄗 | 4 | BEAA |
| 72 | 𠄘 | 4 | BECC |
| 73 | 𠄙 | 4 | CBAA |
| 74 | 𠄚 | 4 | CCBB |
| 75 | 𠄛 | 4 | CCBB |
| 76 | 𠄜 | 4 | CCBE |
| 77 | 𠄝 | 4 | CCCQ |
| 78 | 𠄞 | 4 | CCCQ |
| 79 | 𠄟 | 4 | CCCQ |
| 80 | 𠄠 | 4 | CCCQ |
| 81 | 𠄡 | 4 | CCQB |
| 82 | 𠄢 | 4 | CCQB |
| 83 | 𠄣 | 4 | CCQD |
| 84 | 𠄤 | 4 | CCQO |
| 85 | 𠄥 | 4 | CMCD |
| 86 | 𠄦 | 4 | CQBB |
| 87 | 𠄧 | 4 | DABE |
| 88 | 𠄨 | 4 | DABE |
| 89 | 𠄩 | 4 | DAHO |
| 90 | 𠄪 | 4 | DAJC |
| 91 | 𠄫 | 4 | DAOF |
| 92 | 𠄬 | 4 | DCAB |
| 93 | 𠄭 | 4 | DCBB |
| 94 | 𠄮 | 4 | DCBE |
| 95 | 𠄯 | 4 | DCBE |
| 96 | 𠄰 | 4 | DCBO |
| 97 | 𠄱 | 4 | DCCB |
| 98 | 𠄲 | 4 | DCCQ |
| 99 | 𠄳 | 4 | DCEA |
| 100 | 𠄴 | 4 | DCJC |

| Number | Radical | Strokes | Stroke Order |
|--------|---------|---------|--------------|
| 101 | 𠂇 | 4 | DCJC |
| 102 | 𠂈 | 4 | EAAC |
| 103 | 𠂉 | 4 | EABC |
| 104 | 𠂊 | 4 | EABE |
| 105 | 𠂋 | 4 | EABE |
| 106 | 𠂌 | 4 | EACQ |
| 107 | 𠂍 | 4 | EAEA |
| 108 | 𠂎 | 4 | EAJC |
| 109 | 𠂏 | 4 | FAAB |
| 110 | 𠂐 | 4 | FABB |
| 111 | 𠂑 | 4 | FBBA |
| 112 | 𠂒 | 4 | FBBB |
| 113 | 𠂓 | 4 | FBBB |
| 114 | 𠂔 | 4 | FBCQ |
| 115 | 𠂕 | 4 | FBOE |
| 116 | 𠂖 | 4 | FCCQ |
| 117 | 𠂗 | 4 | HAAB |
| 118 | 𠂘 | 4 | HBBB |
| 119 | 𠂙 | 4 | JCBE |
| 120 | 𠂚 | 4 | KBOE |
| 121 | 𠂛 | 4 | KDBO |
| 122 | 𠂜 | 4 | LBOE |
| 123 | 𠂝 | 4 | OCCQ |
| 124 | 𠂞 | 5 | AABBB |
| 125 | 𠂟 | 5 | AABEA |
| 126 | 𠂠 | 5 | AABEB |
| 127 | 𠂡 | 5 | AABEB |
| 128 | 𠂢 | 5 | AACCQ |
| 129 | 𠂣 | 5 | ABAAB |
| 130 | 𠂤 | 5 | ABAAB |
| 131 | 𠂥 | 5 | ABBBA |
| 132 | 𠂦 | 5 | ABBBB |
| 133 | 𠂧 | 5 | ABEAA |
| 134 | 𠂨 | 5 | ABEAA |
| 135 | 𠂩 | 5 | ABEAA |
| 136 | 𠂪 | 5 | ABEAA |
| 137 | 𠂫 | 5 | ABEAA |
| 138 | 𠂬 | 5 | ABEAA |
| 139 | 𠂭 | 5 | ABFFQ |

| Number | Radical | Strokes | Stroke Order |
|--------|---------|---------|--------------|
| 140 | 𠄎 | 5 | ACCCQ |
| 141 | 𠄏 | 5 | ACCQB |
| 142 | 𠄐 | 5 | ADCJC |
| 143 | 𠄑 | 5 | AEABE |
| 144 | 𠄒 | 5 | AFBBB |
| 145 | 𠄓 | 5 | AOCCQ |
| 146 | 𠄔 | 5 | BAAAB |
| 147 | 𠄕 | 5 | BAAAB |
| 148 | 𠄖 | 5 | BAAAB |
| 149 | 𠄗 | 5 | BAEAA |
| 150 | 𠄘 | 5 | BAFFQ |
| 151 | 𠄙 | 5 | BEAAA |
| 152 | 𠄚 | 5 | BECCQ |
| 153 | 𠄛 | 5 | CAAAB |
| 154 | 𠄜 | 5 | CAABB |
| 155 | 𠄝 | 5 | CBAAA |
| 156 | 𠄞 | 5 | CCBBB |
| 157 | 𠄟 | 5 | CCBBB |
| 158 | 𠄠 | 5 | CCBEA |
| 159 | 𠄡 | 5 | CCCCQ |
| 160 | 𠄢 | 5 | CCCQB |
| 161 | 𠄣 | 5 | CCCQB |
| 162 | 𠄤 | 5 | CCCQD |
| 163 | 𠄥 | 5 | CCCQD |
| 164 | 𠄦 | 5 | CCQCQ |
| 165 | 𠄧 | 5 | CCQOB |
| 166 | 𠄨 | 5 | CQCCQ |
| 167 | 𠄩 | 5 | DAABE |
| 168 | 𠄪 | 5 | DAAJC |
| 169 | 𠄫 | 5 | DABEA |
| 170 | 𠄬 | 5 | DACCQ |
| 171 | 𠄭 | 5 | DCAAB |
| 172 | 𠄮 | 5 | DCABB |
| 173 | 𠄯 | 5 | DCABB |
| 174 | 𠄰 | 5 | DCABE |
| 175 | 𠄱 | 5 | DCABO |
| 176 | 𠄲 | 5 | DCACQ |
| 177 | 𠄳 | 5 | DCAJC |
| 178 | 𠄴 | 5 | DCBAA |

| Number | Radical | Strokes | Stroke Order |
|--------|---------|---------|--------------|
| 179 | 𠂇 | 5 | DCBEA |
| 180 | 𠂈 | 5 | DCBJC |
| 181 | 𠂉 | 5 | DCBOE |
| 182 | 𠂊 | 5 | DCBOP |
| 183 | 𠂋 | 5 | DCCCQ |
| 184 | 𠂌 | 5 | DCFBB |
| 185 | 𠂍 | 5 | DCFCQ |
| 186 | 𠂎 | 5 | DCKBB |
| 187 | 𠂏 | 5 | EAAAB |
| 188 | 𠂐 | 5 | EAAAB |
| 189 | 𠂑 | 5 | EAABE |
| 190 | 𠂒 | 5 | EAABE |
| 191 | 𠂓 | 5 | EAACQ |
| 192 | 𠂔 | 5 | EAAJC |
| 193 | 𠂕 | 5 | EABAE |
| 194 | 𠂖 | 5 | EABEA |
| 195 | 𠂗 | 5 | EABEB |
| 196 | 𠂘 | 5 | EACCQ |
| 197 | 𠂙 | 5 | EACCQ |
| 198 | 𠂚 | 5 | FAAAB |
| 199 | 𠂛 | 5 | FAABB |
| 200 | 𠂜 | 5 | FABBA |
| 201 | 𠂝 | 5 | FABBA |
| 202 | 𠂞 | 5 | FABBB |
| 203 | 𠂟 | 5 | FABBC |
| 204 | 𠂠 | 5 | FBAAA |
| 205 | 𠂡 | 5 | FBAAB |
| 206 | 𠂢 | 5 | FBAAB |
| 207 | 𠂣 | 5 | FBABB |
| 208 | 𠂤 | 5 | FBCCQ |
| 209 | 𠂥 | 5 | FCBEA |
| 210 | 𠂦 | 5 | HBAAB |
| 211 | 𠂧 | 5 | HBAAB |
| 212 | 𠂨 | 5 | HBCCQ |
| 213 | 𠂩 | 5 | JCCCQ |
| 214 | 𠂪 | 5 | KDAAB |
| 215 | 𠂫 | 5 | KDBBB |
| 216 | 𠂬 | 5 | KDBOE |
| 217 | 𠂭 | 5 | KDCCQ |

| Number | Radical | Strokes | Stroke Order |
|--------|---------|---------|--------------|
| 218 | 𠂔 | 5 | OCCBB |
| 219 | 冊 | 6 | AABBBB |
| 220 | 𠂔 | 6 | AABEAA |
| 221 | 𠂔 | 6 | AACCCQ |
| 222 | 𠂔 | 6 | AADCAB |
| 223 | 𠂔 | 6 | AADCJC |
| 224 | 𠂔 | 6 | ABAAAB |
| 225 | 𠂔 | 6 | ABAEAA |
| 226 | 𠂔 | 6 | ABCCQB |
| 227 | 𠂔 | 6 | ABEAAA |
| 228 | 𠂔 | 6 | ACCCQB |
| 229 | 𠂔 | 6 | ACCQCQ |
| 230 | 𠂔 | 6 | AEABEA |
| 231 | 𠂔 | 6 | AKDBBB |
| 232 | 𠂔 | 6 | BAAAAB |
| 233 | 𠂔 | 6 | BAAEAA |
| 234 | 𠂔 | 6 | BAEAAA |
| 235 | 𠂔 | 6 | BAFBBB |
| 236 | 𠂔 | 6 | BEABBB |
| 237 | 𠂔 | 6 | BECCCQ |
| 238 | 𠂔 | 6 | BECCCQ |
| 239 | 𠂔 | 6 | CAABEB |
| 240 | 𠂔 | 6 | CBCCCQ |
| 241 | 𠂔 | 6 | CCBEAA |
| 242 | 𠂔 | 6 | CCBEAA |
| 243 | 𠂔 | 6 | CCBFFQ |
| 244 | 𠂔 | 6 | CCCQCQ |
| 245 | 𠂔 | 6 | CCQBEA |
| 246 | 𠂔 | 6 | CCQCCQ |
| 247 | 𠂔 | 6 | CCQCQB |
| 248 | 𠂔 | 6 | DAABEA |
| 249 | 𠂔 | 6 | DAACCQ |
| 250 | 𠂔 | 6 | DAAEAA |
| 251 | 𠂔 | 6 | DABBAA |
| 252 | 𠂔 | 6 | DABCCQ |
| 253 | 𠂔 | 6 | DABEAA |
| 254 | 𠂔 | 6 | DABEAA |
| 255 | 𠂔 | 6 | DABFCQ |
| 256 | 𠂔 | 6 | DACCCQ |

| Number | Radical | Strokes | Stroke Order |
|--------|---------|---------|--------------|
| 257 | 𠂇 | 6 | DACCQO |
| 258 | 𠂈 | 6 | DCAAJC |
| 259 | 𠂉 | 6 | DCABEA |
| 260 | 𠂊 | 6 | DCABEB |
| 261 | 𠂋 | 6 | DCACCQ |
| 262 | 𠂌 | 6 | DCBAAA |
| 263 | 𠂍 | 6 | DCBAAB |
| 264 | 𠂎 | 6 | DCBABE |
| 265 | 𠂏 | 6 | DCBABE |
| 266 | 𠂐 | 6 | DCBBEA |
| 267 | 𠂑 | 6 | DCBCCQ |
| 268 | 𠂒 | 6 | DCBCCQ |
| 269 | 𠂓 | 6 | DCBEAA |
| 270 | 𠂔 | 6 | DCBEAA |
| 271 | 𠂕 | 6 | DCBECC |
| 272 | 𠂖 | 6 | DCCCCQ |
| 273 | 𠂗 | 6 | DCCQCQ |
| 274 | 𠂘 | 6 | DCEABE |
| 275 | 𠂙 | 6 | DCFABB |
| 276 | 𠂚 | 6 | DCFBEA |
| 277 | 𠂛 | 6 | DCFCCQ |
| 278 | 𠂜 | 6 | DCFQQC |
| 279 | 𠂝 | 6 | EAAAAB |
| 280 | 𠂞 | 6 | EAABBB |
| 281 | 𠂟 | 6 | EAABBE |
| 282 | 𠂠 | 6 | EAACCQ |
| 283 | 𠂡 | 6 | EABABE |
| 284 | 𠂢 | 6 | EABCCQ |
| 285 | 𠂣 | 6 | EABEAA |
| 286 | 𠂤 | 6 | EABEAA |
| 287 | 𠂥 | 6 | EABEAA |
| 288 | 𠂦 | 6 | EABECC |
| 289 | 𠂧 | 6 | EACCCQ |
| 290 | 𠂨 | 6 | EACCCQ |
| 291 | 𠂩 | 6 | EACCQD |
| 292 | 𠂪 | 6 | EAEABE |
| 293 | 𠂫 | 6 | FABBBA |
| 294 | 𠂬 | 6 | FABBBB |
| 295 | 𠂭 | 6 | FBAAAB |

| Number | Radical | Strokes | Stroke Order |
|--------|---------|---------|--------------|
| 296 | 𦉳 | 6 | FBAAJC |
| 297 | 𦉴 | 6 | FBEAAA |
| 298 | 𦉵 | 6 | HBAAAB |
| 299 | 𦉶 | 6 | KBOCCQ |
| 300 | 𦉷 | 6 | KBOEAA |
| 301 | 𦉸 | 6 | KDDBBE |
| 302 | 𦉹 | 6 | LBOEAA |
| 303 | 𦉺 | 6 | OCAAAB |
| 304 | 𦉻 | 6 | OFBAAB |
| 305 | 𦉼 | 7 | AABEAAA |
| 306 | 𦉽 | 7 | AADCBEA |
| 307 | 𦉾 | 7 | AAFBEAA |
| 308 | 𦉿 | 7 | ABBAABE |
| 309 | 𦊀 | 7 | ABEACCQ |
| 310 | 𦊁 | 7 | ABECCCQ |
| 311 | 𦊂 | 7 | ABFQBEA |
| 312 | 𦊃 | 7 | ACCCQCB |
| 313 | 𦊄 | 7 | ACCQAAB |
| 314 | 𦊅 | 7 | ACCQCCQ |
| 315 | 𦊆 | 7 | ACCQCQB |
| 316 | 𦊇 | 7 | ACCQFCQ |
| 317 | 𦊈 | 7 | ADCACCQ |
| 318 | 𦊉 | 7 | ADCBEAA |
| 319 | 𦊊 | 7 | AKDABBB |
| 320 | 𦊋 | 7 | AKDABEB |
| 321 | 𦊌 | 7 | BAEABEA |
| 322 | 𦊍 | 7 | CCQCCCQ |
| 323 | 𦊎 | 7 | CCQCCQB |
| 324 | 𦊏 | 7 | CCQCQBE |
| 325 | 𦊐 | 7 | CCQDCCQ |
| 326 | 𦊑 | 7 | DABAEAA |
| 327 | 𦊒 | 7 | DABCCCQ |
| 328 | 𦊓 | 7 | DABFCCQ |
| 329 | 𦊔 | 7 | DACCCQB |
| 330 | 𦊕 | 7 | DCAABEB |
| 331 | 𦊖 | 7 | DCABAAB |
| 332 | 𦊗 | 7 | DCABABE |
| 333 | 𦊘 | 7 | DCABABE |
| 334 | 𦊙 | 7 | DCABCCQ |

| Number | Radical | Strokes | Stroke Order |
|--------|---------|---------|--------------|
| 335 | 𠂇 | 7 | DCABEAA |
| 336 | 𠂇 | 7 | DCABEAA |
| 337 | 𠂇 | 7 | DCACQCQ |
| 338 | 𠂇 | 7 | DCAMAAA |
| 339 | 𠂇 | 7 | DCBAAAB |
| 340 | 𠂇 | 7 | DCBAAJC |
| 341 | 𠂇 | 7 | DCBBEAA |
| 342 | 𠂇 | 7 | DCBCCCQ |
| 343 | 𠂇 | 7 | DCBOCCQ |
| 344 | 𠂇 | 7 | DCBOEAA |
| 345 | 𠂇 | 7 | DCCCQCQ |
| 346 | 𠂇 | 7 | DCDAABE |
| 347 | 𠂇 | 7 | DCDCCCQ |
| 348 | 𠂇 | 7 | DCEAABE |
| 349 | 𠂇 | 7 | DCEAACQ |
| 350 | 𠂇 | 7 | DCEABEA |
| 351 | 𠂇 | 7 | DCEACCQ |
| 352 | 𠂇 | 7 | DCFAAAB |
| 353 | 𠂇 | 7 | DCFABBB |
| 354 | 𠂇 | 7 | DCFABBB |
| 355 | 𠂇 | 7 | DCFABBB |
| 356 | 𠂇 | 7 | DCFBAAB |
| 357 | 𠂇 | 7 | DCFBEAA |
| 358 | 𠂇 | 7 | DCKDAAB |
| 359 | 𠂇 | 7 | DCKDBBB |
| 360 | 𠂇 | 7 | EAABBAAE |
| 361 | 𠂇 | 7 | EAABEAA |
| 362 | 𠂇 | 7 | EAABEAA |
| 363 | 𠂇 | 7 | EAACCCQ |
| 364 | 𠂇 | 7 | EACBAAB |
| 365 | 𠂇 | 7 | EACCQCQ |
| 366 | 𠂇 | 7 | EADCAAB |
| 367 | 𠂇 | 7 | EADCBOE |
| 368 | 𠂇 | 7 | EAEABEA |
| 369 | 𠂇 | 7 | EAEABEB |
| 370 | 𠂇 | 7 | EAMAAAA |
| 371 | 𠂇 | 7 | FABBAAB |
| 372 | 𠂇 | 7 | FABBABE |
| 373 | 𠂇 | 7 | FABBBBE |

| Number | Radical | Strokes | Stroke Order |
|--------|---------|---------|--------------|
| 374 | 爻 | 7 | FABBCCQ |
| 375 | 爻 | 7 | FABCCCQ |
| 376 | 彳 | 7 | FBAAAAB |
| 377 | 𠂔 | 7 | FBAABMC |
| 378 | 𠂔 | 7 | KDAABBB |
| 379 | 彳 | 7 | KDBOEAA |
| 380 | 𠂔 | 7 | KDDBCCQ |
| 381 | 爻 | 7 | KDDCCCQ |
| 382 | 𠂔 | 7 | OCCBFFQ |
| 383 | 𠂔 | 8 | AABBBBAE |
| 384 | 爻 | 8 | AABBCCQ |
| 385 | 爻 | 8 | AACCQCCQ |
| 386 | 𠂔 | 8 | ABBABEAA |
| 387 | 𠂔 | 8 | ABBCCCQ |
| 388 | 𠂔 | 8 | ABBDCBB |
| 389 | 𠂔 | 8 | ABBDCJC |
| 390 | 𠂔 | 8 | ABBFAAB |
| 391 | 𠂔 | 8 | ABBBLBOE |
| 392 | 𠂔 | 8 | ABDCFCCQ |
| 393 | 𠂔 | 8 | ABEAAABE |
| 394 | 𠂔 | 8 | ABEA AFCQ |
| 395 | 𠂔 | 8 | ABEABEAA |
| 396 | 𠂔 | 8 | ABECCQCCQ |
| 397 | 𠂔 | 8 | ABFQABBB |
| 398 | 𠂔 | 8 | ABFQABFQ |
| 399 | 𠂔 | 8 | ABFQABFQ |
| 400 | 爻 | 8 | ACCQCCQ |
| 401 | 𠂔 | 8 | BBAABEAA |
| 402 | 𠂔 | 8 | BEAACCCQ |
| 403 | 𠂔 | 8 | CCCQBEAA |
| 404 | 𠂔 | 8 | DAABBBEA |
| 405 | 𠂔 | 8 | DABAAABE |
| 406 | 𠂔 | 8 | DABDCKBB |
| 407 | 𠂔 | 8 | DADCFCCQ |
| 408 | 𠂔 | 8 | DCAABEAA |
| 409 | 𠂔 | 8 | DCAACCQB |
| 410 | 𠂔 | 8 | DCABAABB |
| 411 | 𠂔 | 8 | DCABABEM |
| 412 | 𠂔 | 8 | DCABACCQ |

| Number | Radical | Strokes | Stroke Order |
|--------|---------|---------|--------------|
| 413 | 𠂇 | 8 | DCABAFQCQ |
| 414 | 𠂈 | 8 | DCABEAAA |
| 415 | 𠂉 | 8 | DCACBAAA |
| 416 | 𠂊 | 8 | DCACCBEA |
| 417 | 𠂋 | 8 | DCACCQCQ |
| 418 | 𠂌 | 8 | DCADCBOE |
| 419 | 𠂍 | 8 | DCADCFCQ |
| 420 | 𠂎 | 8 | DCBABEAA |
| 421 | 𠂏 | 8 | DCBCCQCQ |
| 422 | 𠂐 | 8 | DCBECCCQ |
| 423 | 𠂑 | 8 | DCDABEAA |
| 424 | 𠂒 | 8 | DCDCEABE |
| 425 | 𠂓 | 8 | DCEAABEA |
| 426 | 𠂔 | 8 | DCEABCCQ |
| 427 | 𠂕 | 8 | DCEABEAA |
| 428 | 𠂖 | 8 | DCEABECC |
| 429 | 𠂗 | 8 | DCEACCCQ |
| 430 | 𠂘 | 8 | DCEADCBE |
| 431 | 𠂙 | 8 | DCFQCCCQ |
| 432 | 𠂚 | 8 | EAACCCQB |
| 433 | 𠂛 | 8 | EAAEAAAB |
| 434 | 𠂜 | 8 | EAAFBEAA |
| 435 | 𠂝 | 8 | EAAKDBBB |
| 436 | 𠂞 | 8 | EADCACCQ |
| 437 | 𠂟 | 8 | FABBACCQ |
| 438 | 𠂠 | 8 | FABBBAJC |
| 439 | 𠂡 | 8 | FABBBEAA |
| 440 | 𠂢 | 8 | FABBCEBA |
| 441 | 𠂣 | 8 | FABBCCQO |
| 442 | 𠂤 | 8 | FABBDCBB |
| 443 | 𠂥 | 8 | FABBEABE |
| 444 | 𠂦 | 8 | FBAABEAC |
| 445 | 𠂧 | 8 | FBBBCCCQ |
| 446 | 𠂨 | 8 | KDDCCQBE |
| 447 | 𠂩 | 8 | LBOEABBB |
| 448 | 𠂪 | 9 | AABBBACCQ |
| 449 | 𠂫 | 9 | AACCCQCCQ |
| 450 | 𠂬 | 9 | ABBBBBEAA |
| 451 | 𠂭 | 9 | ABBBCCCQB |

| Number | Radical | Strokes | Stroke Order |
|--------|---------|---------|--------------|
| 452 | 芥 | 9 | ABBBCQBEA |
| 453 | 蒺 | 9 | ABBBKDBBB |
| 454 | 夏 | 9 | ABEAACCCQ |
| 455 | 𦉳 | 9 | BAEAAABBB |
| 456 | 𦉴 | 9 | CCCQABBBA |
| 457 | 𦉵 | 9 | DABDCFCCQ |
| 458 | 𦉶 | 9 | DCAABEAAA |
| 459 | 𦉷 | 9 | DCABABEAA |
| 460 | 𦉸 | 9 | DCABABEAA |
| 461 | 𦉹 | 9 | DCADCBCCQ |
| 462 | 𦉺 | 9 | DCBCCCQCQ |
| 463 | 𦉻 | 9 | DCBOEABBB |
| 464 | 𦉼 | 9 | DCFABBBBA |
| 465 | 𦉽 | 9 | DCFABBCCQ |
| 466 | 𦉾 | 9 | DCFABBCCQ |
| 467 | 𦉿 | 9 | DCFQQCCCQ |
| 468 | 𦊀 | 9 | EAAJCDABE |
| 469 | 𦊁 | 9 | EAAKDBBBB |
| 470 | 𦊂 | 9 | EABECCCQA |
| 471 | 𦊃 | 9 | EABECCCQA |
| 472 | 𦊄 | 9 | EACBECCCQ |
| 473 | 𦊅 | 9 | EACCQCCCQ |
| 474 | 𦊆 | 9 | FABBABEAA |
| 475 | 𦊇 | 9 | FABBBACCQ |
| 476 | 𦊈 | 9 | FABBCBEAA |
| 477 | 𦊉 | 9 | FABBEACCQ |
| 478 | 𦊊 | 9 | FABBFABBA |
| 479 | 𦊋 | 9 | FCCQABBBA |
| 480 | 𦊌 | 10 | AABBBCQCQ |
| 481 | 𦊍 | 10 | AABBBKDBBB |
| 482 | 𦊎 | 10 | AACCCQDCAB |
| 483 | 𦊏 | 10 | ABBBACCCQB |
| 484 | 𦊐 | 10 | ABBBFBAAAB |
| 485 | 𦊑 | 10 | ABEAAABBBA |
| 486 | 𦊒 | 10 | ABEDCABCCQ |
| 487 | 𦊓 | 10 | DABEAACCCQ |
| 488 | 𦊔 | 10 | DCAABBBBEA |
| 489 | 𦊕 | 10 | DCBABECCCQ |
| 490 | 𦊖 | 10 | DCEABECCCQ |

| Number | Radical | Strokes | Stroke Order |
|--------|---------|---------|------------------|
| 491 | 𦰇 | 10 | DCFABBBAAAB |
| 492 | 𦰈 | 10 | DCFABBBCCQ |
| 493 | 𦰉 | 10 | DCFCQABBBA |
| 494 | 𦰊 | 10 | EACCQABBBA |
| 495 | 𦰋 | 10 | EACFABCCCQ |
| 496 | 𦰌 | 10 | FABBAABCCQ |
| 497 | 𦰍 | 10 | FABBCCQCCQ |
| 498 | 𦰎 | 10 | FABBDCBAAB |
| 499 | 𦰏 | 10 | FABBDCFCCQ |
| 500 | 𦰐 | 11 | AABBBAABBBA |
| 501 | 𦰑 | 11 | AABBBBAECCQ |
| 502 | 𦰒 | 11 | AABBBCCQCCQ |
| 503 | 𦰓 | 11 | AABBBDCFCCQ |
| 504 | 𦰔 | 11 | AABBBECCCQA |
| 505 | 𦰕 | 11 | AABBBECCCQD |
| 506 | 𦰖 | 11 | ABBBAABCCBB |
| 507 | 𦰗 | 11 | ABBBAABCCBB |
| 508 | 𦰘 | 11 | ABEAADCBCCCQ |
| 509 | 𦰙 | 11 | ABFQBEAABBB |
| 510 | 𦰚 | 11 | DACCCQBCCQ |
| 511 | 𦰛 | 11 | DCACCQABBBA |
| 512 | 𦰜 | 11 | EAAJCKDDBBE |
| 513 | 𦰝 | 11 | FABBBBECCCQ |
| 514 | 𦰞 | 11 | KDDBAEDACCQ |
| 515 | 𦰟 | 12 | ABECCCQCCQ |
| 516 | 𦰠 | 12 | DABABBBKDBBB |
| 517 | 𦰡 | 12 | DCFABBBBEAAA |
| 518 | 𦰢 | 12 | DCFABBBBEAAA |
| 519 | 𦰣 | 12 | DCFABBBDCBOE |
| 520 | 𦰤 | 12 | EAACCCQBCCQ |
| 521 | 𦰥 | 12 | FABBDCBBEABE |
| 522 | 𦰦 | 13 | ABBBDCBBEAAAB |
| 523 | 𦰧 | 13 | CCCQABEAACCCQ |
| 524 | 𦰨 | 13 | DCFABBBCCQABE |
| 525 | 𦰩 | 13 | DCFABBBCCQABE |
| 526 | 𦰪 | 13 | DCFABBBOCAAAB |
| 527 | 𦰫 | 16 | DCFABBBCCQAABCCQ |

The characters assigned to each radical are ordered by residual stroke count and stroke order using the same principles used for ordering radicals. The resultant ordering of the proposed set of 6,221 characters is shown in Appendix A. Appendix A is available in a separate document, N3577R-A.

Note that the ideographic description sequences in Appendix A show the minimal possible decomposition of characters into their component parts using an extension to the set of radicals proposed in N3495 (Proposal to encode Tangut Radicals and CJK Strokes in the UCS). By applying the IDS decompositions of this set of radicals it would be possible to generate maximally decomposed IDS sequences for the proposed set of Tangut characters.

4. Source Mappings. Appendix B shows the mappings of the proposed set of characters to Kyčanov 2006, Lǐ Fànwén 1997/2008 and Hán Xiǎománg 2004, as well as to the corresponding character or characters in PDAM7 (because of unifications in the original proposal there is a one-to-many relationship between the PDAM7 Tangut repertoire and our proposed repertoire). Appendix B is available in a separate document, N3577R-B. In the Source Mapping Table, the following conventions are used:

- Col.1 = Proposed Code Point
- Col.2 = Hán Xiǎománg 2004
- Col.3 = Lǐ Fànwén 1997
- Col.4 = Lǐ Fànwén 2008
- Col.5 = Kyčanov 2006
- Col.6 = PDAM7 Code Point (there are many-to-one mappings from the PDAM7 code points to the new code points because of unifications in the PDAM7 repertoire)
- Col.7 = Notes

5. Bibliography

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A. Administrative

1. Title

Proposal for a revised Tangut character set for encoding in the SMP of the UCS

2. Requester's name

Michael Everson, Nathan Hill, Guillaume Jacques, Andrew West, Viacheslav Zaytsev

3. Requester type (Member body/Liaison/Individual contribution)

Individual contribution.

4. Submission date

2009-04-08

5. Requester's reference (if applicable)

6. Choose one of the following:

6a. This is a complete proposal

No.

6b. More information will be provided later

Yes.

B. Technical – General

1. Choose one of the following:

1a. This proposal is for a new script (set of characters)

Yes.

1b. Proposed name of script

Tangut Radicals.

1c. The proposal is for addition of character(s) to an existing block

1d. Name of the existing block

2. Number of characters in proposal

6,221.

3. Proposed category (A-Contemporary; B.1-Specialized (small collection); B.2-Specialized (large collection); C-Major extinct; D-Attested extinct; E-Minor extinct; F-Archaic Hieroglyphic or Ideographic; G-Obscure or questionable usage symbols)

Category F.

4a. Is a repertoire including character names provided?

Yes.

4b. If YES, are the names in accordance with the "character naming guidelines" in Annex L of P&P document?

Yes.

4c. Are the character shapes attached in a legible form suitable for review?

Yes.

5a. Who will provide the appropriate computerized font (ordered preference: True Type, or PostScript format) for publishing the standard?

Michael Everson.

5b. If available now, identify source(s) for the font (include address, e-mail, ftp-site, etc.) and indicate the tools used:

Michael Everson, Fontographer.

6a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided?

Yes.

6b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached?

Yes.

7. Does the proposal address other aspects of character data processing (if applicable) such as input, presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)?

Yes.

8. Submitters are invited to provide any additional information about Properties of the proposed Character(s) or Script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script. Examples of such properties are: Casing information, Numeric information, Currency information, Display behaviour information such as line breaks, widths etc., Combining behaviour, Spacing behaviour, Directional behaviour, Default Collation behaviour, relevance in Mark Up contexts, Compatibility equivalence and other Unicode normalization related information. See the Unicode standard at <http://www.unicode.org> for such information on other scripts. Also see Unicode Character Database <http://www.unicode.org/Public/UNIDATA/UnicodeCharacterDatabase.html> and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.

See above.

C. Technical – Justification

1. Has this proposal for addition of character(s) been submitted before? If YES, explain.

No.

2a. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)?

Yes.

2b. If YES, with whom?

Co-authors are Tangutologists

2c. If YES, available relevant documents

3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included?

Scholars.

4a. The context of use for the proposed characters (type of use; common or rare)

Rare.

4b. Reference

5a. Are the proposed characters in current use by the user community?

Yes.

5b. If YES, where?

In scholarly publications.

6a. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP?

No.

6b. If YES, is a rationale provided?

6c. If YES, reference

7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)?

Yes.

8a. Can any of the proposed characters be considered a presentation form of an existing character or character sequence?

No.

8b. If YES, is a rationale for its inclusion provided?

8c. If YES, reference

9a. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters?

No.

9b. If YES, is a rationale for its inclusion provided?

9c. If YES, reference

10a. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character?

No.

10b. If YES, is a rationale for its inclusion provided?

10c. If YES, reference

11a. Does the proposal include use of combining characters and/or use of composite sequences (see clauses 4.12 and 4.14 in ISO/IEC 10646-1: 2000)?

No.

11b. If YES, is a rationale for such use provided?

11c. If YES, reference

11d. Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided?

No.

11e. If YES, reference

12a. Does the proposal contain characters with any special properties such as control function or similar semantics?

No.

12b. If YES, describe in detail (include attachment if necessary)

13a. Does the proposal contain any Ideographic compatibility character(s)?

No.

13b. If YES, is the equivalent corresponding unified ideographic character(s) identified?