

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 to encode Western Cham in the SMP of the UCS****Source: UC Berkeley Script Encoding Initiative (Universal Scripts Project)****Author: Michael Everson and Andrew Cunningham****Status: Liaison Contribution****Action: For consideration by JTC1/SC2/WG2 and UTC****Date: 2016-06-13**

**1. Disunification.** Document N4711 requested the addition of seven new Cham characters to the UCS. These letters are used in Western Cham, a distinct but related language spoken in Cambodia and Vietnam; Eastern Cham is spoken in Vietnam. Its font style and the reference glyphs in the UCS are quite different from those used in Western Cham. After considerable discussion with the user community about glyph acceptability and mutual intelligibility of the two languages, it appears that the best thing to do is to disunify the two scripts. A simple font change from Eastern to Western style does not render a text automatically legible for speakers of the two communities. Perhaps the difference is similar to the spectrum of Romance dialects from Portuguese to Romanian.

**2. Implementation.** A number of successful font implementations have already been developed for Western Cham using the Eastern Cham code positions. A one-to-one relationship between the two code charts has been maintained. Characters specific to Western Cham are given here in the same positions they had in N4711. Perhaps those characters should be added to the Eastern Cham block as well for compatibility but that option would best be left for further study. A note should be added at the top of the current Cham block stating “*These characters are used for Eastern Cham. See also the Western Cham block beginning at U+1E200*”.

**3. Additions to the repertoire.** Seven characters in addition to the ones corresponding to the existing Cham encoding need to be added along with the disunification. Five of these letters represent final consonants, one represents a fossilized syllable, and one is a punctuation character. If this proposal is accepted, the following characters will be encoded:

1E23B	ꨀ	CHAM LETTER FINAL PH
1E23C	ꨁ	CHAM LETTER FINAL B
1E23D	ꨂ	CHAM LETTER FINAL M
1E23E	ꨃ	CHAM LETTER FINAL V
1E23F	ꨄ	CHAM LETTER FINAL S
1E24F	ꨀꨀ	CHAM LETTER NAAN
1E25B	ꨀꨀꨀ	CHAM TANA PATOK SAP

• repetition sign

Western Cham has adopted loan words from Malay, Khmer, Arabic and other languages. Additional final consonants have been added to the Cham character repertoire to write these words.

The additional Cham characters covered by this proposal fall into two groups:

1. Pre-existing characters in use within Cambodia, and
2. Characters added to Western Cham by the Cham Language Advisory Committee (2011–2012) in Cambodia, and subsequently the characters have been in use in Cham literacy programs and are used in Cham literacy materials.

**3.1. Final consonants.** Five additional explicit final consonants are required by Western Cham, as used in Cambodia: PH, B, M, V, and S.

U+1E23B 𑜏 WESTERN CHAM LETTER FINAL PH is the final form of U+1E21C 𑜎 WESTERN CHAM LETTER PHA. This letter was added by the Cham Language Advisory Committee to represent a final “f” sound in loan words. See Figure 1.

U+1E23C 𑜐 WESTERN CHAM LETTER FINAL B is the final form of U+1E21D 𑜍 WESTERN CHAM LETTER BA. This letter was added to the Western Cham repertoire by the Cham Language Advisory Committee to distinguish and differentiate separate sounds that were originally represented by U+1E247 𑜑 WESTERN CHAM LETTER FINAL P. See Figure 2.

U+1E23D 𑜒 WESTERN CHAM LETTER FINAL M is the final form of U+1E21F 𑜏 WESTERN CHAM LETTER MUE. See Figure 3.

U+1E23E 𑜓 WESTERN CHAM LETTER FINAL V is the final form of U+1E225 𑜕 WESTERN CHAM LETTER VA. This letter has a long established use in Western Cham in Cambodia but has no corresponding character in Vietnam. See Figure 4.

U+1E23F 𑜔 WESTERN CHAM LETTER FINAL S is the final form of U+1E227 𑜇 WESTERN CHAM LETTER SA. Western Cham uses this FINAL S instead of using U+1E24B 𑜑 WESTERN CHAM LETTER FINAL SS, which fell out of traditional usage in Cambodia. In Cambodia, FINAL S is used in contexts that in Vietnam would see FINAL SS used. See Figure 5.

**3.2. WESTERN CHAM LETTER NAAN.** U+1E24F 𑜙 WESTERN CHAM LETTER NUN is used to represent a complete syllable. The glyph is based on what appears to be a ligature of U+1E217 𑜎 WESTERN CHAM LETTER NUE. and U+1E246 𑜑 WESTERN CHAM LETTER FINAL N. Ligation is not a productive feature of Cham, so this fossilized form should be encoded uniquely. This character was not one of the additions of the reform, but is a pre-existing character. It is treated as part of the Cham alphabet, placed in the same column as the independent vowels. In Cham language classes in Cambodia it is taught as a specific letter of the Cham alphabet. The age of this character is currently unknown; many books and manuscripts were destroyed during the Khmer Rouge Period and the community have been attempting to recover their literary past. It is currently used to represent the word *nān* ‘that’. See Figure 6.

**3.3. Repetition sign.** Western Cham documents in Cambodia use a repetition sign U+1E25B 𑜛 TANA PATOK SAP. Its function in Cham is similar to the function of U+17D7 𑜇 LEK TOO in Khmer. See Figure 7.

**4. Glyph comparison.** Western Cham characters are given here next to the Eastern Cham characters already encoded to facilitate glyph comparison.

1E200	ꨀ	ꨀ	A	1E22D	ꨀ	ꨀ	-U
1E201	ꨁ	ꨁ	I	1E22E	ꨀ	ꨀ	-OE
1E202	ꨂ	ꨂ	U	1E22F	ꨀ	ꨀ	-O
1E203	ꨃ	ꨃ	E	1E230	ꨀ	ꨀ	-AI
1E204	ꨄ	ꨄ	AI	1E231	ꨀ	ꨀ	-AU
1E205	ꨅ	ꨅ	O	1E232	ꨀ	ꨀ	-UE
1E206	ꨆ	ꨆ	KA	1E233	ꨀ	ꨀ	-YA
1E207	ꨇ	ꨇ	KHA	1E234	ꨀ	ꨀ	-RA
1E208	ꨈ	ꨈ	GA	1E235	ꨀ	ꨀ	-LA
1E209	ꨉ	ꨉ	GHA	1E236	ꨀ	ꨀ	-WA
1E20A	ꨊ	ꨊ	NGUE	1E23B	ꨀ	(ꨀ)	-PH
1E20B	ꨋ	ꨋ	NGA	1E23C	ꨀ	(ꨀ)	-B
1E20C	ꨌ	ꨌ	CHA	1E23D	ꨀ	(ꨀ)	-M
1E20D	ꨍ	ꨍ	CHHA	1E23E	ꨀ	(ꨀ)	-V
1E20E	ꨎ	ꨎ	JA	1E23F	ꨀ	(ꨀ)	-S
1E20F	ꨏ	ꨏ	JHA	1E240	ꨀ	ꨀ	-K
1E210	ꨐ	ꨐ	NHUE	1E241	ꨀ	ꨀ	-G
1E211	ꨑ	ꨑ	NHA	1E242	ꨀ	ꨀ	-NG
1E212	ꨒ	ꨒ	NHJA	1E243	ꨀ	ꨀ	-NG (cons. sign)
1E213	ꨓ	ꨓ	TA	1E244	ꨀ	ꨀ	-CH
1E214	ꨔ	ꨔ	THA	1E245	ꨀ	ꨀ	-T
1E215	ꨕ	ꨕ	DA	1E246	ꨀ	ꨀ	-N
1E216	ꨖ	ꨖ	DHA	1E247	ꨀ	ꨀ	-P
1E217	ꨗ	ꨗ	NUE	1E248	ꨀ	ꨀ	-Y
1E218	ꨘ	ꨘ	NA	1E249	ꨀ	ꨀ	-R
1E219	ꨙ	ꨙ	DDA	1E24A	ꨀ	ꨀ	-L
1E21A	ꨚ	ꨚ	PA	1E24B	ꨀ	ꨀ	-SS
1E21B	ꨛ	ꨛ	PPA	1E24C	ꨀ	ꨀ	-M (cons. sign)
1E21C	ꨜ	ꨜ	PHA	1E24D	ꨀ	ꨀ	-H (cons. sign)
1E21D	ꨝ	ꨝ	BA	1E24F	ꨀ	(ꨀ)	NAAN
1E21E	ꨞ	ꨞ	BHA	1E250	ꨀ	ꨀ	0
1E21F	ꨟ	ꨟ	MUE	1E251	ꨀ	ꨀ	1
1E220	ꨠ	ꨠ	MA	1E252	ꨀ	ꨀ	2
1E221	ꨡ	ꨡ	BBA	1E253	ꨀ	ꨀ	3
1E222	ꨢ	ꨢ	YA	1E254	ꨀ	ꨀ	4
1E223	ꨣ	ꨣ	RA	1E255	ꨀ	ꨀ	5
1E224	ꨤ	ꨤ	LA	1E256	ꨀ	ꨀ	6
1E225	ꨥ	ꨥ	VA	1E257	ꨀ	ꨀ	7
1E226	ꨦ	ꨦ	SSA	1E258	ꨀ	ꨀ	8
1E227	ꨧ	ꨧ	SA	1E259	ꨀ	ꨀ	9
1E228	ꨨ	ꨨ	HA	1E25B	ꨀ	(ꨀ)	TANA PATOK SAP
1E229	ꨩ	ꨩ	-AA	1E25C	ꨀ	ꨀ	SPIRAL
1E22A	ꨪ	ꨪ	-I	1E25D	ꨀ		DANDA
1E22B	ꨫ	ꨫ	-II	1E25E	ꨀ	ꨀ	DOUBLE DANDA
1E22C	ꨬ	ꨬ	-EI	1E25F	ꨀ	ꨀ	TRIPLE DANDA

## 5. Unicode Character properties

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1E200;WESTERN CHAM LETTER A;Lo;0;L;;;;N;;;;;
1E201;WESTERN CHAM LETTER I;Lo;0;L;;;;N;;;;;
1E202;WESTERN CHAM LETTER U;Lo;0;L;;;;N;;;;;
1E203;WESTERN CHAM LETTER E;Lo;0;L;;;;N;;;;;
1E204;WESTERN CHAM LETTER AI;Lo;0;L;;;;N;;;;;
1E205;WESTERN CHAM LETTER O;Lo;0;L;;;;N;;;;;
1E206;WESTERN CHAM LETTER KA;Lo;0;L;;;;N;;;;;
1E207;WESTERN CHAM LETTER KHA;Lo;0;L;;;;N;;;;;
1E208;WESTERN CHAM LETTER GA;Lo;0;L;;;;N;;;;;
1E209;WESTERN CHAM LETTER GHA;Lo;0;L;;;;N;;;;;
1E20A;WESTERN CHAM LETTER NGUE;Lo;0;L;;;;N;;;;;
1E20B;WESTERN CHAM LETTER NGA;Lo;0;L;;;;N;;;;;
1E20C;WESTERN CHAM LETTER CHA;Lo;0;L;;;;N;;;;;
1E20D;WESTERN CHAM LETTER CHHA;Lo;0;L;;;;N;;;;;
1E20E;WESTERN CHAM LETTER JA;Lo;0;L;;;;N;;;;;
1E20F;WESTERN CHAM LETTER JHA;Lo;0;L;;;;N;;;;;
1E210;WESTERN CHAM LETTER NHUE;Lo;0;L;;;;N;;;;;
1E211;WESTERN CHAM LETTER NHA;Lo;0;L;;;;N;;;;;
1E212;WESTERN CHAM LETTER NHJA;Lo;0;L;;;;N;;;;;
1E213;WESTERN CHAM LETTER TA;Lo;0;L;;;;N;;;;;
1E214;WESTERN CHAM LETTER THA;Lo;0;L;;;;N;;;;;
1E215;WESTERN CHAM LETTER DA;Lo;0;L;;;;N;;;;;
1E216;WESTERN CHAM LETTER DHA;Lo;0;L;;;;N;;;;;
1E217;WESTERN CHAM LETTER NUE;Lo;0;L;;;;N;;;;;
1E218;WESTERN CHAM LETTER NA;Lo;0;L;;;;N;;;;;
1E219;WESTERN CHAM LETTER DDA;Lo;0;L;;;;N;;;;;
1E21A;WESTERN CHAM LETTER PA;Lo;0;L;;;;N;;;;;
1E21B;WESTERN CHAM LETTER PPA;Lo;0;L;;;;N;;;;;
1E21C;WESTERN CHAM LETTER PHA;Lo;0;L;;;;N;;;;;
1E21D;WESTERN CHAM LETTER BA;Lo;0;L;;;;N;;;;;
1E21E;WESTERN CHAM LETTER BHA;Lo;0;L;;;;N;;;;;
1E21F;WESTERN CHAM LETTER MUE;Lo;0;L;;;;N;;;;;
1E220;WESTERN CHAM LETTER MA;Lo;0;L;;;;N;;;;;
1E221;WESTERN CHAM LETTER BBA;Lo;0;L;;;;N;;;;;
1E222;WESTERN CHAM LETTER YA;Lo;0;L;;;;N;;;;;
1E223;WESTERN CHAM LETTER RA;Lo;0;L;;;;N;;;;;
1E224;WESTERN CHAM LETTER LA;Lo;0;L;;;;N;;;;;
1E225;WESTERN CHAM LETTER VA;Lo;0;L;;;;N;;;;;
1E226;WESTERN CHAM LETTER SSA;Lo;0;L;;;;N;;;;;
1E227;WESTERN CHAM LETTER SA;Lo;0;L;;;;N;;;;;
1E228;WESTERN CHAM LETTER HA;Lo;0;L;;;;N;;;;;
1E229;WESTERN CHAM VOWEL SIGN AA;Mn;0;NSM;;;;N;;;;;
1E22A;WESTERN CHAM VOWEL SIGN I;Mn;0;NSM;;;;N;;;;;
1E22B;WESTERN CHAM VOWEL SIGN II;Mn;0;NSM;;;;N;;;;;
1E22C;WESTERN CHAM VOWEL SIGN EI;Mn;0;NSM;;;;N;;;;;
1E22D;WESTERN CHAM VOWEL SIGN U;Mn;0;NSM;;;;N;;;;;
1E22E;WESTERN CHAM VOWEL SIGN OE;Mn;0;NSM;;;;N;;;;;
1E22F;WESTERN CHAM VOWEL SIGN O;Mc;0;L;;;;N;;;;;
1E230;WESTERN CHAM VOWEL SIGN AI;Mc;0;L;;;;N;;;;;
1E231;WESTERN CHAM VOWEL SIGN AU;Mn;0;NSM;;;;N;;;;;
1E232;WESTERN CHAM VOWEL SIGN UE;Mn;0;NSM;;;;N;;;;;
1E233;WESTERN CHAM CONSONANT SIGN YA;Mc;0;L;;;;N;;;;;
1E234;WESTERN CHAM CONSONANT SIGN RA;Mc;0;L;;;;N;;;;;
1E235;WESTERN CHAM CONSONANT SIGN LA;Mn;0;NSM;;;;N;;;;;
1E236;WESTERN CHAM CONSONANT SIGN WA;Mn;0;NSM;;;;N;;;;;
1E23B;WESTERN CHAM LETTER FINAL PH;Lo;0;L;;;;N;;;;;
1E23C;WESTERN CHAM LETTER FINAL B;Lo;0;L;;;;N;;;;;
1E23D;WESTERN CHAM LETTER FINAL M;Lo;0;L;;;;N;;;;;
1E23E;WESTERN CHAM LETTER FINAL V;Lo;0;L;;;;N;;;;;
1E23F;WESTERN CHAM LETTER FINAL S;Lo;0;L;;;;N;;;;;
1E240;WESTERN CHAM LETTER FINAL K;Lo;0;L;;;;N;;;;;
1E241;WESTERN CHAM LETTER FINAL G;Lo;0;L;;;;N;;;;;
1E242;WESTERN CHAM LETTER FINAL NG;Lo;0;L;;;;N;;;;;
1E243;WESTERN CHAM CONSONANT SIGN FINAL NG;Mn;0;NSM;;;;N;;;;;
1E244;WESTERN CHAM LETTER FINAL CH;Lo;0;L;;;;N;;;;;
1E245;WESTERN CHAM LETTER FINAL T;Lo;0;L;;;;N;;;;;
1E246;WESTERN CHAM LETTER FINAL N;Lo;0;L;;;;N;;;;;
1E247;WESTERN CHAM LETTER FINAL P;Lo;0;L;;;;N;;;;;
1E248;WESTERN CHAM LETTER FINAL Y;Lo;0;L;;;;N;;;;;
1E249;WESTERN CHAM LETTER FINAL R;Lo;0;L;;;;N;;;;;
1E24A;WESTERN CHAM LETTER FINAL L;Lo;0;L;;;;N;;;;;
1E24B;WESTERN CHAM LETTER FINAL SS;Lo;0;L;;;;N;;;;;
1E24C;WESTERN CHAM CONSONANT SIGN FINAL M;Mn;0;NSM;;;;N;;;;;

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1E24D;WESTERN CHAM CONSONANT SIGN FINAL H;Mc;0;L;;;;N;;;;;  
1E24F;WESTERN CHAM LETTER NAAN;Lo;0;L;;;;N;;;;;  
1E250;WESTERN CHAM DIGIT ZERO;Nd;0;L;;0;0;0;N;;;;;  
1E251;WESTERN CHAM DIGIT ONE;Nd;0;L;;1;1;1;N;;;;;  
1E252;WESTERN CHAM DIGIT TWO;Nd;0;L;;2;2;2;N;;;;;  
1E253;WESTERN CHAM DIGIT THREE;Nd;0;L;;3;3;3;N;;;;;  
1E254;WESTERN CHAM DIGIT FOUR;Nd;0;L;;4;4;4;N;;;;;  
1E255;WESTERN CHAM DIGIT FIVE;Nd;0;L;;5;5;5;N;;;;;  
1E256;WESTERN CHAM DIGIT SIX;Nd;0;L;;6;6;6;N;;;;;  
1E257;WESTERN CHAM DIGIT SEVEN;Nd;0;L;;7;7;7;N;;;;;  
1E258;WESTERN CHAM DIGIT EIGHT;Nd;0;L;;8;8;8;N;;;;;  
1E259;WESTERN CHAM DIGIT NINE;Nd;0;L;;9;9;9;N;;;;;  
1E25B;WESTERN CHAM SIGN TANA PATOK SAP;Lm;0;L;;;;N;;;;;  
1E25C;WESTERN CHAM PUNCTUATION SPIRAL;Po;0;L;;;;N;;;;;  
1E25D;WESTERN CHAM PUNCTUATION DANDA;Po;0;L;;;;N;;;;;  
1E25E;WESTERN CHAM PUNCTUATION DOUBLE DANDA;Po;0;L;;;;N;;;;;  
1E25F;WESTERN CHAM PUNCTUATION TRIPLE DANDA;Po;0;L;;;;N;;;;;





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**Figure 3.** Example showing CHAM FINAL LETTER M in use. From *Cham Literary Textbook 1*, second edition, 2013. Phnom Penh: Emerging Markets Consulting.

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 ក្រី ក្រី ក្រី ក្រី ក្រី ក្រី ក្រី ក្រី ក្រី ក្រី ក្រី ក្រី ក្រី ក្រី ក្រី

**Figure 4.** Example showing CHAM FINAL LETTER V in use. Note how this handwritten sample hangs the letters from a topline, rather than resting them on a baseline.

Handwritten text in Cham script, showing several instances of the final letter 'S' circled in red. The text is written in a cursive style on a light-colored background.

Figure 5. Handwritten example showing CHAM FINAL LETTER S in use.

Handwritten text in Cham script, showing several instances of the letter 'N' circled in red. The text is written in a cursive style on a light-colored background.

Figure 6. Handwritten example showing CHAM LETTER NUN in use.





	1E20	1E21	1E22	1E23	1E24	1E25
0	𑜀 1E200	𑜁 1E210	𑜂 1E220	𑜃 1E230	𑜄 1E240	𑜅 1E250
1	𑜆 1E201	𑜇 1E211	𑜈 1E221	𑜉 1E231	𑜊 1E241	𑜋 1E251
2	𑜌 1E202	𑜍 1E212	𑜎 1E222	𑜏 1E232	𑜐 1E242	𑜑 1E252
3	𑜒 1E203	𑜓 1E213	𑜔 1E223	𑜕 1E233	𑜖 1E243	𑜗 1E253
4	𑜙 1E204	𑜚 1E214	𑜛 1E224	𑜜 1E234	𑜝 1E244	𑜞 1E254
5	𑜟 1E205	𑜠 1E215	𑜡 1E225	𑜢 1E235	𑜣 1E245	𑜤 1E255
6	𑜥 1E206	𑜦 1E216	𑜧 1E226	𑜨 1E236	𑜩 1E246	𑜪 1E256
7	𑜬 1E207	𑜭 1E217	𑜮 1E227		𑜰 1E247	𑜱 1E257
8	𑜳 1E208	𑜴 1E218	𑜵 1E228		𑜷 1E248	𑜸 1E258
9	𑜹 1E209	𑜺 1E219	𑜻 1E229		𑜽 1E249	𑜾 1E259
A	𑜿 1E20A	𑀀 1E21A	𑀁 1E22A		𑀃 1E24A	
B	𑀅 1E20B	𑀆 1E21B	𑀇 1E22B	𑀈 1E23B	𑀉 1E24B	𑀊 1E25B
C	𑀌 1E20C	𑀍 1E21C	𑀎 1E22C	𑀏 1E23C	𑀐 1E24C	𑀑 1E25C
D	𑀒 1E20D	𑀓 1E21D	𑀔 1E22D	𑀕 1E23D	𑀖 1E24D	𑀗 1E25D
E	𑀙 1E20E	𑀚 1E21E	𑀛 1E22E	𑀜 1E23E		𑀝 1E25E
F	𑀟 1E20F	𑀠 1E21F	𑀡 1E22F	𑀢 1E23F	𑀣 1E24F	𑀤 1E25F

**Independent vowels**

1E200	ꨀ	WESTERN CHAM LETTER A
1E201	ꨁ	WESTERN CHAM LETTER I
1E202	ꨂ	WESTERN CHAM LETTER U
1E203	ꨃ	WESTERN CHAM LETTER E
1E204	ꨄ	WESTERN CHAM LETTER AI
1E205	ꨅ	WESTERN CHAM LETTER O

**Consonants**

1E206	ꨆ	WESTERN CHAM LETTER KA
1E207	ꨇ	WESTERN CHAM LETTER KHA
1E208	ꨈ	WESTERN CHAM LETTER GA
1E209	ꨉ	WESTERN CHAM LETTER GHA
1E20A	ꨊ	WESTERN CHAM LETTER NGUE
1E20B	ꨋ	WESTERN CHAM LETTER NGA
1E20C	ꨌ	WESTERN CHAM LETTER CHA
1E20D	ꨍ	WESTERN CHAM LETTER CHHA
1E20E	ꨎ	WESTERN CHAM LETTER JA
1E20F	ꨏ	WESTERN CHAM LETTER JHA
1E210	ꨐ	WESTERN CHAM LETTER NHUE
1E211	ꨑ	WESTERN CHAM LETTER NHA
1E212	ꨒ	WESTERN CHAM LETTER NHJA
1E213	ꨓ	WESTERN CHAM LETTER TA
1E214	ꨔ	WESTERN CHAM LETTER THA
1E215	ꨕ	WESTERN CHAM LETTER DA
1E216	ꨖ	WESTERN CHAM LETTER DHA
1E217	ꨗ	WESTERN CHAM LETTER NUE
1E218	ꨘ	WESTERN CHAM LETTER NA
1E219	ꨙ	WESTERN CHAM LETTER DDA
1E21A	ꨚ	WESTERN CHAM LETTER PA
1E21B	ꨛ	WESTERN CHAM LETTER PPA
1E21C	ꨜ	WESTERN CHAM LETTER PHA
1E21D	ꨝ	WESTERN CHAM LETTER BA
1E21E	ꨞ	WESTERN CHAM LETTER BHA
1E21F	ꨟ	WESTERN CHAM LETTER MUE
1E220	ꨠ	WESTERN CHAM LETTER MA
1E221	ꨡ	WESTERN CHAM LETTER BBA
1E222	ꨢ	WESTERN CHAM LETTER YA
1E223	ꨣ	WESTERN CHAM LETTER RA
1E224	ꨤ	WESTERN CHAM LETTER LA
1E225	ꨥ	WESTERN CHAM LETTER VA
1E226	ꨦ	WESTERN CHAM LETTER SSA
1E227	ꨧ	WESTERN CHAM LETTER SA
1E228	ꨨ	WESTERN CHAM LETTER HA

**Dependent vowel signs**

1E229	ꨩ	WESTERN CHAM VOWEL SIGN 1E2
1E22A	ꨪ	WESTERN CHAM VOWEL SIGN I
1E22B	ꨫ	WESTERN CHAM VOWEL SIGN II
1E22C	ꨬ	WESTERN CHAM VOWEL SIGN EI
1E22D	ꨭ	WESTERN CHAM VOWEL SIGN U
1E22E	ꨮ	WESTERN CHAM VOWEL SIGN OE
1E22F	ꨯ	WESTERN CHAM VOWEL SIGN O
1E230	ꨰ	WESTERN CHAM VOWEL SIGN AI
1E231	ꨱ	WESTERN CHAM VOWEL SIGN AU
1E232	ꨲ	WESTERN CHAM VOWEL SIGN UE

**Consonant signs**

1E233	ꨳ	WESTERN CHAM CONSONANT SIGN YA
1E234	ꨴ	WESTERN CHAM CONSONANT SIGN RA
1E235	ꨵ	WESTERN CHAM CONSONANT SIGN LA
1E236	ꨶ	WESTERN CHAM CONSONANT SIGN WA

**Final letters**

1E23B	꨷	WESTERN CHAM LETTER FINAL PH
1E23C	꨸	WESTERN CHAM LETTER FINAL B
1E23D	꨹	WESTERN CHAM LETTER FINAL M

1E23E	꨺	WESTERN CHAM LETTER FINAL V
1E23F	꨻	WESTERN CHAM LETTER FINAL S
1E240	꨼	WESTERN CHAM LETTER FINAL K
1E241	꨽	WESTERN CHAM LETTER FINAL G
1E242	꨾	WESTERN CHAM LETTER FINAL NG
1E243	꨿	WESTERN CHAM CONSONANT SIGN FINAL NG
1E244	ꩀ	WESTERN CHAM LETTER FINAL CH
1E245	ꩁ	WESTERN CHAM LETTER FINAL T
1E246	ꩂ	WESTERN CHAM LETTER FINAL N
1E247	ꩃ	WESTERN CHAM LETTER FINAL P
1E248	ꩄ	WESTERN CHAM LETTER FINAL Y
1E249	ꩅ	WESTERN CHAM LETTER FINAL R
1E24A	ꩆ	WESTERN CHAM LETTER FINAL L
1E24B	ꩇ	WESTERN CHAM LETTER FINAL SS
1E24C	ꩈ	WESTERN CHAM CONSONANT SIGN FINAL M
1E24D	ꩉ	WESTERN CHAM CONSONANT SIGN FINAL H

**Consonants**

1E24F	ꩊ	WESTERN CHAM LETTER NAAN
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**Digits**

1E250	ꩋ	WESTERN CHAM DIGIT ZERO
1E251	ꩌ	WESTERN CHAM DIGIT ONE
1E252	ꩍ	WESTERN CHAM DIGIT TWO
1E253	꩎	WESTERN CHAM DIGIT THREE
1E254	꩏	WESTERN CHAM DIGIT FOUR
1E255	꩐	WESTERN CHAM DIGIT FIVE
1E256	꩑	WESTERN CHAM DIGIT SIX
1E257	꩒	WESTERN CHAM DIGIT SEVEN
1E258	꩓	WESTERN CHAM DIGIT EIGHT
1E259	꩔	WESTERN CHAM DIGIT NINE

**Various signs**

1E25B	꩕	WESTERN CHAM SIGN TANA PATOK SAP
		• repetition sign
		→ 0E46 ꩖ thai character maiyamok
		→ 17D7 ꩗ khmer character lek too

**Punctuation**

1E25C	꩘	WESTERN CHAM PUNCTUATION SPIRAL
1E25D	꩙	WESTERN CHAM PUNCTUATION DANDA
1E25E	꩚	WESTERN CHAM PUNCTUATION DOUBLE DANDA
1E25F	꩛	WESTERN CHAM PUNCTUATION TRIPLE DANDA

## A. Administrative

1. Title

**Proposal to encode Western Cham in the SMP of the UCS**

2. Requester's name

**Script Encoding Initiative (authors: Michael Everson and Andrew Cunningham)**

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

**Liaison contribution.**

4. Submission date

**2016-06-13**

5. Requester's reference (if applicable)

6. Choose one of the following:

6a. This is a complete proposal

**Yes.**

6b. More information will be provided later

**No.**

## 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

**Western Cham.**

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

**No.**

1d. Name of the existing block

2. Number of characters in proposal

**90.**

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 A.**

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. Fontlab.**

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

**No.**

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.

**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?

**Andrew Cunningham, William Noseworthy.**

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?

**Users of Cham.**

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

**Common.**

4b. Reference

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

**Yes.**

5b. If YES, where?

**In Cambodia.**

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)?

**No.**

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.**

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

**No.**

11a. Does the proposal include use of combining characters and/or use of composite sequences?

**Yes.**

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

**No.**

11c. If YES, reference

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

**No.**

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

**No.**