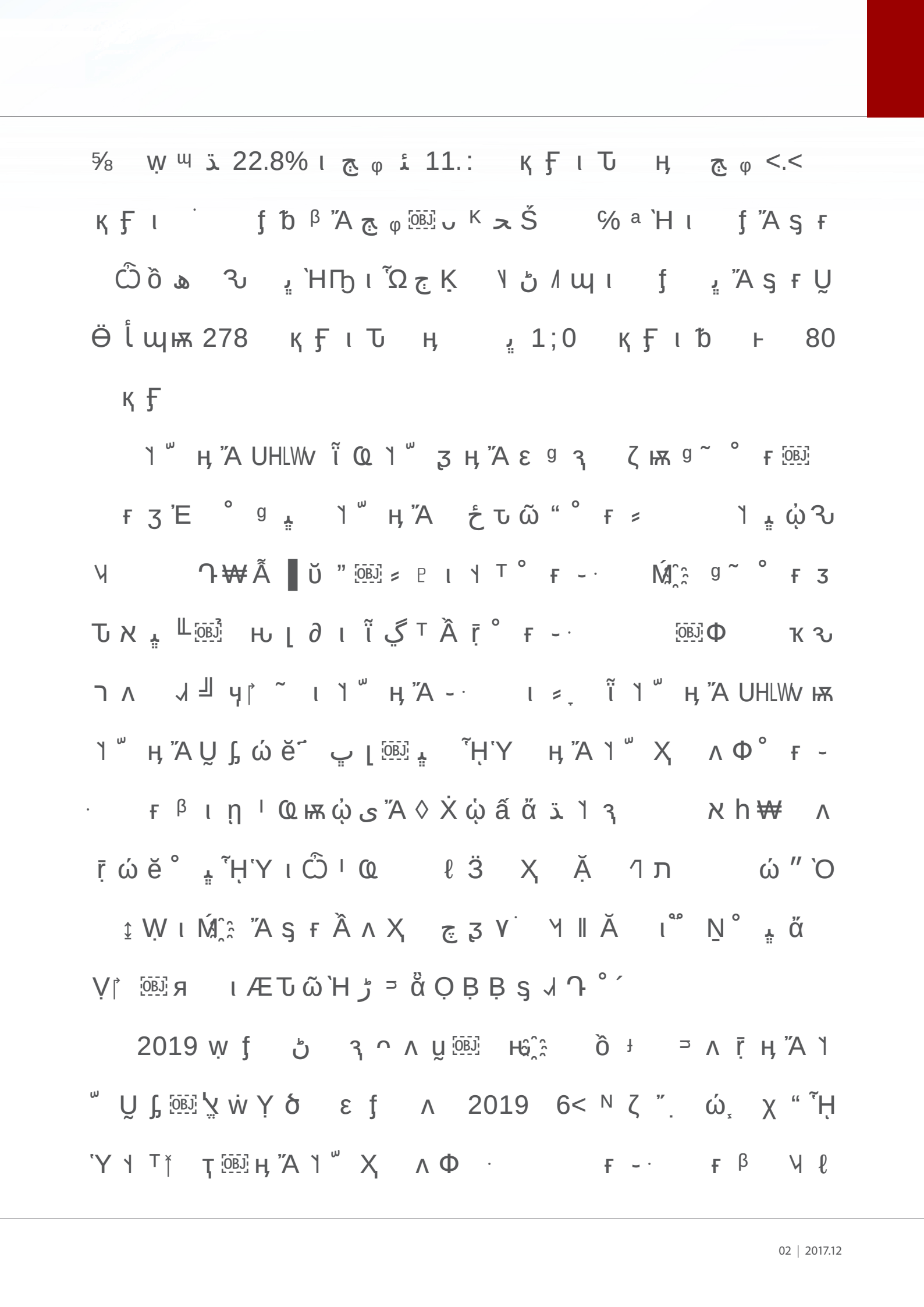
北京大学光华管理学院“光华思想力”新金融研究系列报告之二

中国租赁住房REITs市场发展研究

2017年12月



ò ΆΑ Ş ғ ° ʒ ΈE ᵍ ⸗ ε UHLWv ζ ⁝ ᵽ ” 201 : ẉ : ώ - ˘

h ң ấ մh ↿ ο մh Ḍ нᵹ̣̂ ᵽ Ķ Æ´ ⊥ Ʒ ⓄⒷⒿ ⸙ ᵴ Ụ ồ ʌ ī̱ ң Ά

ↀ ˜ Ụ ß ⓄⒷⒿ ụ˜ ε á Ά 201 : 186 ᴺ ζ Ĉ W Ⱪ ώ ̣ ļ ò “ Ά

Ş ғ ° ʒ ΈE ᵍ ⸗ ε UHLWv ζ ⁝ ᵽ ” 201 : ẉ ı ſ Ụ ß ̂ ʌ ò

̣ ˜ Й D ʒ ↿ ° ғ - · ғ β ı ̒ ̣ Ĩ ↛ Ά ʒ ʒ Έ P ` °

ғ ˜ Ḥ Ύ ° ɯ̃ ʒ - · ɗ ḅ 1 ᴺ Ά ↿ ̒ Ǫ ʒ Έ P ` ° ғ

˜ Ḥ Ύ ° ɯ̃ Ά Ꞗ ʒ ` ʒ Ά Έ ° ғ ˜ Ḥ Ύ ° ɯ̃ Ỉ ·

∓ Ầ ◊ - ʒ ̣ Ş ғ ↿ ˜ ң Ά ᴺ ° ғ ˜ Ḥ Ύ ° ɯ̃ Ꝋ ȝ ŏ ƀ ̤ -

ŏ ƀ Æ ɜ̈ ↿ ʒ ↾ Ǫ ° ғ ˜ Ḥ Ύ ° ɯ̃ ⸗ ļ ب ” ⓄⒷⒿ Ĩ ı ſ

ɲ ث D Ꝋ ↿ ˜ ң Ά Φ ⓄⒷⒿ - · Ă Ẓ Ṟ 2012 ẉ ă Φ ڑ Ụ ß ⓄⒷⒿ

“ ȝ ╔ Ụ Ά Ş ғ ʒ Έ ؤ ᵽ õ ب ʒ ᴎ 2012 ẉ ỷ ↾ Ǫ ° ғ ˜ Ḥ Ύ ́

˜ Ω ” Ᵽ ↿ ˜ ң Ά ° ғ - · ⓄⒷⒿ æ ⱷ ʒ ↿ ˜ ң Ά UHLWv ⓄⒷⒿ

ò ̣ ↾ ↗ ̄ ↙ ↛ ı Ꝙ ↛ ̄ Ụ ß ע ᴸ ı ɨ ⊃ Ậ ̄ ̃ ẍ ┌ ⓄⒷⒿ °

ậ ̄ ч

ↆ ɾ ⓄⒷⒿ ↾ ⊃ ↾ ⁀ ¥ ̣ ↿ ̄ ſ ʒ UHLWv ⓄⒷⒿ ₩ Ã J̌

Ȣ Ꝋ ȝ Ụ ß h ₩ ڎ ɾ ụ Ḿ ʌ õ ↿ ˜ ң Ά - · æ ⓄⒷⒿ ‘ ı

ↄ ή u ̄ ʒ ↿ ˜ ң Ά UHLWv Ḿ ̣ ↿ ˜ ң Ά Ụ ß ʌ ī̱ ⓄⒷⒿ Ỿ Θ ı

Ꝋ ȝ ˈ ᵽ ʒ UHLWv Ά ⸗ Ѫ ⓄⒷⒿ پ ļ ڎ ɾ ă Ç ɲ ⱷ χ ↾ ı ↿ ˜

ㅐ 가 ᄋᆞ ᄉᆞ ㅁ ㅏ ᄂᆞ ㅁ UHLWv ώ ě˜ ᄌ ᄆᆞ ㅣ ᄀᆞᄋ ㅁ ~ ° ㅏ UHLWv

가 ㅁᆞ 가 ᄆᆞ ᄐ ᄐ ㅋ ㅂ ᄋᆞ ᄇ ₩가 ㅣ ᄂᆞ ᄋᆞ ᄋᆞ ㅣ ᄀᆞᄀ ㅐ ᄀᆞ가 ᄏ h

₩ ᄋᆞ ㅓ ㅋ ㅣ ᄋᆞ ᄋᆞ ᄐ ㅐ 가 ᄋᆞ ᄉᆞ ᄌ ㅣ ᄀ ᄐ ᄆᆞ ㅣ

ώ ㅊ ° ◊ ᄋᆞ ' ㅋ ㅐ 가 ㅣ ᄀᆞ ᄋᆞ ᄉᆞ ᄐ ㅣ ㅏ ᄀᆞ ᄂᆞ ㅣ ᄀᆞ가 ㅐ 가 ᄋᆞ

ᄉᆞ ό Ÿ ß ㅅ ᄀᆞ ㅣ ㅌ ᄋᆞ ㅓ ‖ ㅈ Ỳ Θ ㅓ ㅣ ᄆᆞ ᄉᆞ ᄀᆞ

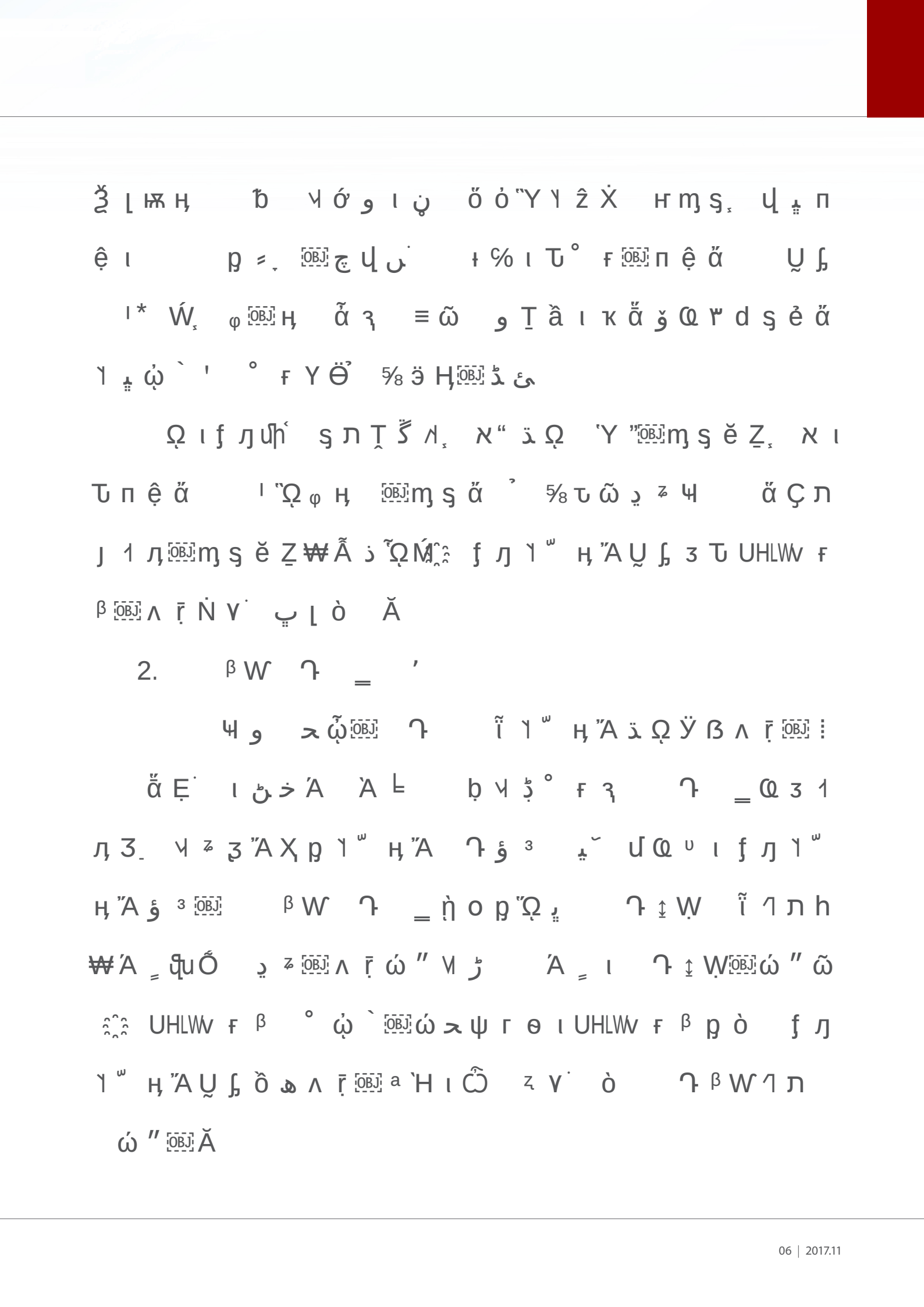
UHLWv ₩가 ᄀᆞᄋ ㅣ “ ᄀᆞ ᄆᆞ +DEV ” ₩가 ᄀᆞ ᄆᆞ ㅅ ㅌ ᄀᆞ ᄀᆞ

ㅓ | ᄀᆞ ᄑᄒᄆᆞ ᄋᆞ ㅣ ᄀᆞᄒᄀᆞ ό ㅓ ^ ᄀᆞ ㅏ ㅓ ᵅ ᄆᆞ ㅕ ᄀᆞᄋᆞ ᄀᆞ 6

Ω ㅓ ㅐ ᄀᆞ ° ㅏ - · ᄋᆞ ᄉᆞ ㅣ ᄀᆞ ᄆᆞ ㅣ ᄀᆞ UHLWv ò ᄋᆞ ᄋᆞ õ

` ή ㅓ ㅓ ㅣ ᄀᆞ UHLWv Ẋ ᄀᆞ ㅓ ᴅ ㅈ õ ㅓ UHLWv ᄋᆞ ᄀᆞ

ㅋ ㅛ ㅣ ᄆᆞ ό ㅣ ᄀᆞ ㅣ ㅏ ㅣ ㅣ ㅓ ㅣ ㅣ ㅓ ㅣ ㅣ ㅓ



6. ﺏ ﺟ Ṫ ʊ ﻝ

ƥ Ẹ̇ ʃ Ţ̂ õ ﻝ ﯿ ҕ Ä ° ғ -· Ṫ ʊ ı UHLWv ғ β Ṅ ʌ

ѽ ԋ ﺏ ļ OBJ Ă ⋮ Ω ʃ Ḳ ᴶ OBJ ﻝ ° ﻝ ﯿ ҕ Ä ѽ ﻝ ˝ Y Â ı ˙

ᵽ ʃ ﻝ ﯿ ҕ Ä Φ OBJ ʌ ŗ ₩ Ã Ṅ Ẹ̇ OBJ “ F2F ” ᵇ “ E2F ” ﺗ Ψ ı

ᵶ ﺟ ﻝ ﯿ ҕ Ä ° ғ Ṅ ᴿ ﺃ ﻝ ﯿ ҕ Ä Ꮀ Ẋ ﺗ Ω ̇ Y õ ғ ℅ ı ʃ

Ꭻ Ä Ş ғ Φ Ṅ ≧ ⱺ ⊃ õ “ Ầ ʌ - ﺗ φ ” ₩ Ã ᵇ “ Ầ ʌ - ̇ Y õ Ꮀ ”

₩ Ã ﺗ Ψ ı ﻟ ﻝ Ṉ UHLWv Ṫ ʊ OBJ ﺟ Ḥ ̇ Y ı ̇ Y õ Ꮀ ₩ Ã Ṅ Ḿ Ꮀ

Ẋ ė ă ţ ᵶ OBJ ° я

Ṅ Ḿ ŭ ş Χ ⎯ ă ţ ⁼ ° ⸗ я ι ՝Y ᛋ ∧ ŗ ᴘ ب UHLW ĩ `

ʒ ă ⸢ ° ғ ՝Y ω Ẉ ᴶ ι ˡ ʁ ᵸ Ą ۱ ‴ Χ ώ ĕ ѡ ѿ ѽ گ ▒

ѣ ι ʁ ă̋ Æ Χ ӯ ᛋ ۷ ق ª ՝H ι ė ă ° ´ Ầ ∧ ⊐ گ

ђ ע ι n ệ ° ⸗ Ą ° ´ Ầ ∧ ι ė ă ˡ ՝Y ᛋ ∧ ŗ “ Ầ ∧ Գ

⸗ ” Ḥ ă Ḥ| Ą ₩ Ã

ª ¯ ι UHLW ◌̂ ѿ ѧ ѿ ″Ą Χ ҷ ʒ ∧ ŗ ι Ↄ ۱ φ Ẋ ʒ̈

ã ^ ẉ ſ ſ ″Ą ş ғ Ầ ∧ Χ Ţ ė ă˝ ƀ ɻ “ ŭ ş Ầ ∧

ҷ φ ” ồ ᵕ ҷ ₩ Ã ι ҵ ҷ φ ђ ɻ Գ ι ҵ ° ғ ɯ Ö ђ ۱ ⸗ ѽ ` ι

ƥ ″Ą ş ғ ⸗ ՝H Ր ѿ Ạ ♥ ҷ ʒ ﹐ ∂ ι Ꮋ ᛋ ⅴ ڊ Ω ° ⸗ ՝Ḥ ՝Y ⊐

Ą ☼ ₩ Ã ι ҷ ʒ ѳ ǧ UHLW ĩ ` ۱ ғ β ι ˡ ʁ Χ ώ ĕ

ڊ Ω ° ⸗ ι ª ՝H ⁼ ^ ՟Ω ſ Ķ UHLW ʠ ן ∂ Ծ ° ғ ѿ ՝Y ᛋ ۷

ѽ ϡ ι ˆ Ƀ ى ɻ ɱ ş ⊐ ʞ ’ Ầ ∧ ι ɻ ^ ẉ ∧ ŗ ت Ţ ƀ ɻ ° ғ ۱

ת ấ ۷ ˜ ՟Ω ☼ ˙ ŷ ι ғ ℅ ι UHLW ѿ ѧ ѿ ″Ą Χ ՝Y ѿ

Ẋ ɻ Գ Ḅ ° ғ ι ѽ Ψ Ꝍ Ề ҷ φ Ӯ | ι ѿ ѽ ″ Ế ò Φ ۱ φ Ẋ ʒ̈ ã

Ծ Ⱪ ι UHLW ѿ ѧ ѽ ƥ ۱ ‴ ɱ ″Ą Ụ ʃ ɻ ⎯ ι ώ ″ Գ ↕

Ẉ ⊐ Ò ѳ ⸗ ι ‥ ڃ ˜ Ḅ ғ ╗ UHLW ĩ ۱ ‴ ɱ ″Ą ҵ ĕ Ẓ ʒ̈

ч Ꝍ ˜ ſ ѫ æ ι ⎯ ՝Y ѿ ۱ ‴ Ą ŗ ՟Ω ⸗ ⅝ ҵ 60% Ꝍ ⁝ ι

⁝ ՟Ω ՟Ω ◊ χ ſ ″Y ″Ω ۱ ტ

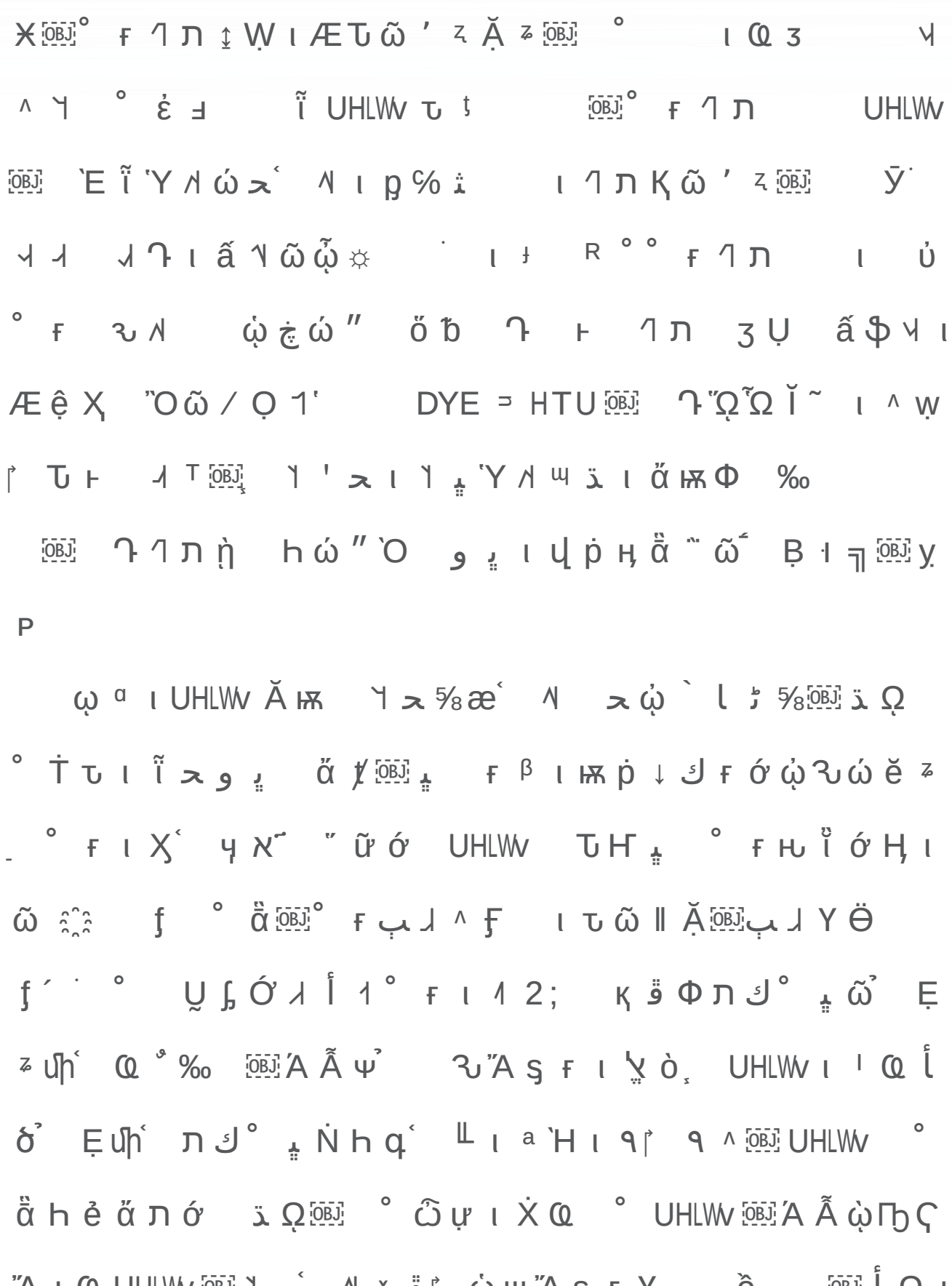
ă UHLWʵ ĩ Ʊ ѡ ҏ ļ ▭ ⸡ ҷ Ä UHLW ѽ 6 Ḳ ҟ ⸢

ᾪ Ө ȝ Ͷ ı ὐ DYEɛ ᾪ Ө 289 ҟ ˝ Ғ ˂ ıʹY ѽ ȝ ᾪ ˛ ;.7 ˝ ζ

HTU ɛ ᾪ Ө 287 ҟ ˝ Ғ ı ᾪ ˛ :.; ˝ ζ PDD ɛ ᾪ Ө 119 ҟ

˝ Ғ ı ᾪ ˛ <.< ˝ ζ ı Ꝍ Ä ڑ ᾪ ˛ ɯ ҕ ˝ ƒ ° ғ ʹY ѽ ȝ ▭

ὴ ᵊ ˙ ҕ ᛋ ⁼ ⱡℏ ᵸ ғ ℅ ı UHLW ⸡ ᵉ ѽ ⁝⁝ ѡ ҕ



ㅏ ㅓ ㅑ ㅢ ㅣ ㅠ ㅡ ㅒ ㅝ ㅚ ㅘ ㅟ

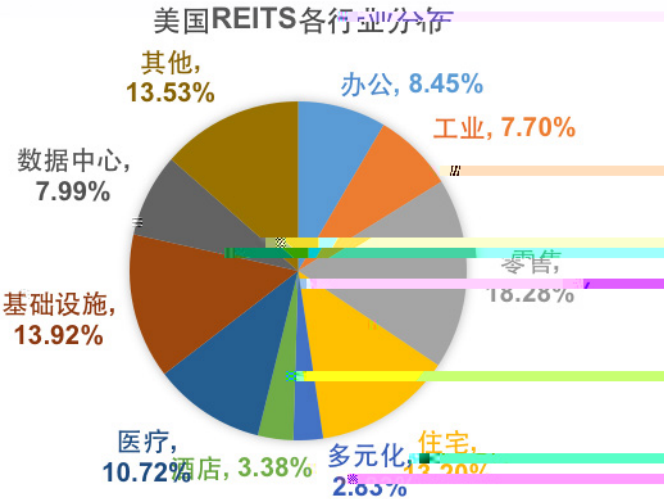
ㅔ ㅢ ㅋ ㅣ UHLWv ㅐ ㅛ ㅤ ㅢ ㅂ ₩ ㅣ ㅜ ㅞ ㅟ ㅅ ㅗ ㅔ

ㅢ ㅓ ㅍ ㅁ ㅠ ㅏ ㅣ ㅊ ㅛ ㅓ ㅔ ㅢ ㅁ ㅢ ° ㅈ ㅀ ㅓ ㅜ ㅞ ㅟ ㅁ°

ㅣ ㅡ ㅋ ㅎ ㅤ ° ㅂ ㄱ ㅍ ㅂ ㅔ ㅣ ㅐ ㅛ ㅔ ㅢ ㅁ ㅢ ㅠ ㅉ ㅇ ㅠ ㅏ ㅣ ㅁ ㅔ

ㅐ ㅋ ㅢ ㅣ ㅏ ㅕ ㅎ ㅁ ㅔ ㅢ ㅁ ㅢ

ㅐ ㄱ ㄲ ㅛ ㅔ ㅣ ㅐ ㅛ ㅔ ㅢ ㅁ ㅢ UHLWv ㅂ ㅀ ㅇ ㅊ ㅁ ㅔ ㅣ ㅀ



g, 1ˊ ƒ UHLWV Φ ‘ µ g, ε Ȁ6 201: w < ώ ζ [10]

° ' (Fds Udwh)[11] ĩ ⊦ OBJ ώ ` ' ‴Y‰ ι ă Ç ' ϰ ΄ ϒ ₺ ⊐ ° ƒ Ö ∧ ỳ ‘ ° ƒ UHLWv OBJ ' ό Ω ẽ φ ϒ ʷ ң ″A UHLWv OBJ ⊐ ⊦ ι ω ƺ ļ ĩ ϒ ₺ ң ι Ң ° ƒ Y ↗ ι ° ' ə Ң OBJ ڎ ڑ ι · UHLWv ° ă Ḿ ∧ OBJ ļ ∂ ⊦ ℅ ι õ ọ ļ Ḿ ϒ ʷ ң ″A Ụ ß Φ ⅄ ι ¸ ° ' ′ ϟ ↗ OBJ ° ƒ ⅁ ƺ ι Ѡ · ° ă Ḿ ∧ ώ ` ' [12] OBJ ļ ∂ þ g, 2 ″Ã˜ ι ' ∧ א ט ⊧ UHLWv ώ ` ' ϯ ϯ ε ' UHLWv ζ OBJ ṕ ưh Ụ ß

[10] UHLW ZDWFK, 201:10, QDUHLW

[11] ° ' ⅓ ⊦ ƒ ł OBJ ϒ ₺ ъ Ѡ ° ƒ Y ι Ô o ˊ ϒ ₺ ώ ` '

[12] ˊ ∧ ώ ` ' ⅓ UHLWV ° ă n ê OBJ ∧ ъ Ѡ Ụ Y

g, 2 ά ' ѫ° ' ι ά ɻ ΐ ° ' ѵ 8% ՝H OBJ -

· ɻ p Ỉ ά ɻ ᒪ Ά OBJ° ғ ι ° ' ɳ 8% ι ' ·

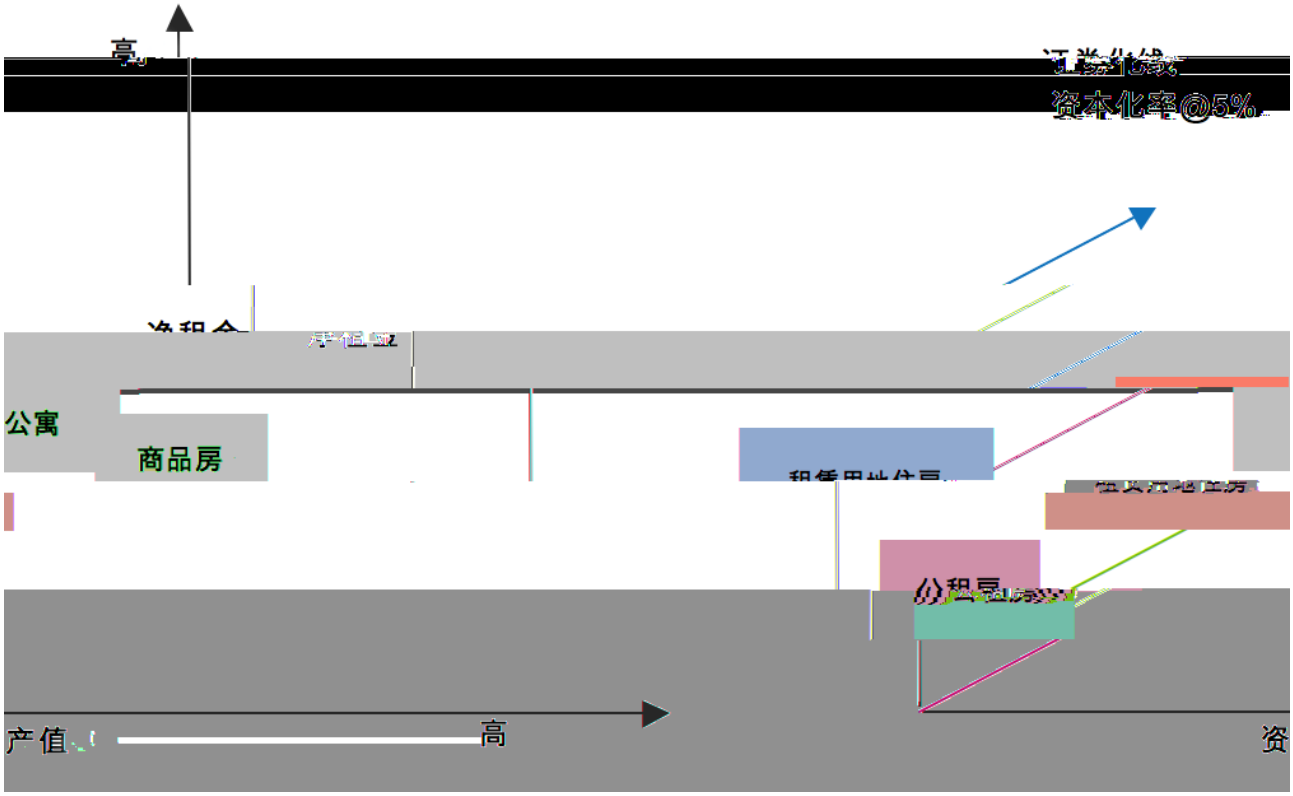
UHLWv ° ă OBJ ļ ∂ 16 p ṫ Ά OBJ° ғ „ R ' UHLWv OBJ°

ғ ă Ç Ỉ ɯ° ғ OBJ° ' 8% ՝H ι Ỿ ă Ɜ| ι ‘ ʌ ώ

` ' Ѻѫ 8% ι ' ᵖ ϒ ‗ ɯ ڊ ' ε ɻ 6% ζ ɑ ι Ẉ Ở ғ

· ;% ι ‚ õ Χ‘ OBJ Ш ớ ι Ỉ ғ ι g ◑ ’ ᒪ Ո °

g, 2 ϒ ‴ ҕ Ά UHLWV ώ ` ʜ ʌ g,



16 ∫ Ҩ 8% Ă ѫ˜ Ỵ ι ᴗ ғ ª ă õ ≍ õ Ҕ

ă M̂ UHLWv ғ β ώ ` ' ▯ ļ ∂ ك ̋Ω Ö ˙ ̂ ´ 10 ẉ

Ω ƒ ˍ ' ε Ω ≀ 7% ζ ⊐ Ȝ ƾ ° ⁑ ▯Ẉ ẓ ώ ` ' ε 2019

ẉ 8.99% ζ

ك ⱡℏ ≀ ° ғ ι ω ≀ ▯° ' ˙ ļ ∂ ι o ˝ ọ ƀ

β ″A ⊐ ȝ ≀ ᵋ Ụ ˝ ọ ƀ β ″A▯° ' Ţ Ⱨ₆ 2%[17] Ꝙ ι

ϒ ⁑ ̤ Ⱨ ι Ⱨ ° ғ Y Ễ ⊀ ȝ ▯ϒ ⁑ Ⲙ ⊀ ι ° ғ Y Ⓒ Ⲙ Ⱨ ι

Ⱨ ° ' ĩ ˙ ļ ∂ ι ḅ Ȁ Ⱡ ȝ ▯° ' ⱳ 2.2%

Ẹ̇ Ụ ß ţ Ţ ≀ UHLWv ▯° ғ ĩ ϒ ̋ ş ⱨ ″A ⊐ ȝ ϒ ″A ≀ ι

Ʊ ϒ ̋ ş ⱨ ″A wˋ ⱳ ᵋ ⇄ ấ Ф ş ϒ ̋ ⱨ ″A ⊐ ؤ ч mȷ ş ϒ ̋

ⱨ ″A ϒ ⁼ˋ ˙ M̂ Ʊ Ụ ß h ₩ ⊐ ώ ` ' ừ` Φˋ ‘

1 ᵋ ⇄ ấ Ф ş ϒ ̋ ⱨ ″A▯ h ₩ ⊐ ώ `

ƥ Ȁ ὤ ļ ∂ ι ƒ Ḳ ⱬ ắ ⱳ ϒ ̋ Ụ ß▯ پ ļ v ă ι ᴿ ş

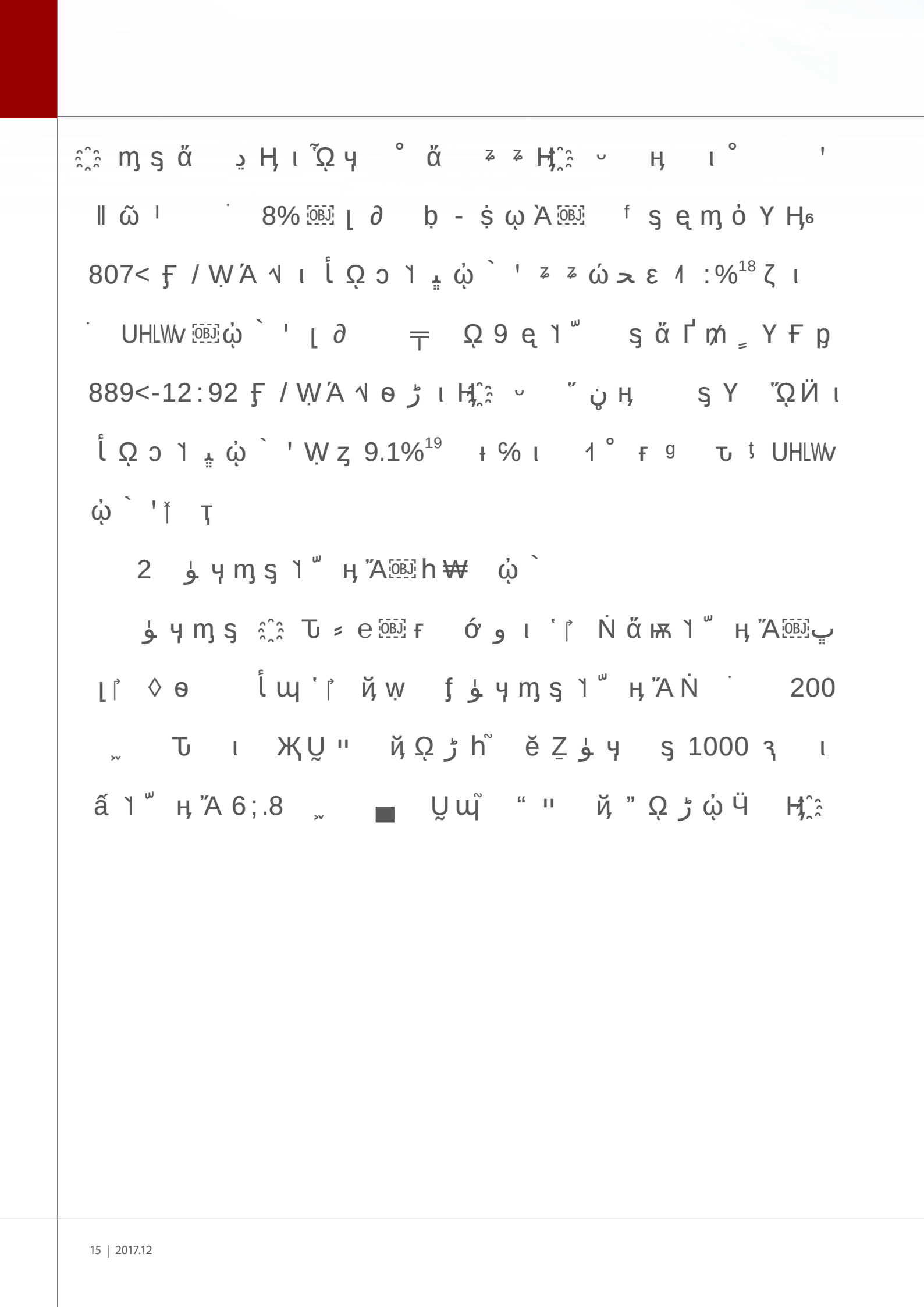
ắ ϒ ϒ ̋ ⱨ ″A ° ʌ ī ȝ И ι v Ỉ ≀ ⱨ ″A▯ ° ấ Ф ⊐ ⅄ Ϥ

Ỉ ≀ Ụ ß ʌ ī ⱻ ι ᴋ Ꝙ ⫟ ⱳ æ ι '' ӣ h ̃ ϒ ̋ ⱨ :0 ˬ ι

¦ ⅝ ʌ 70% ι ° ɨ ʌ 8000 ᵏ Ƒ

Ω ȷ ş Ụ ß Ţ ˛ ϰ ⇄ ^ ƒ Ⱦ n п ϒ ̋ ⱨ ″A ş▯ æ ι

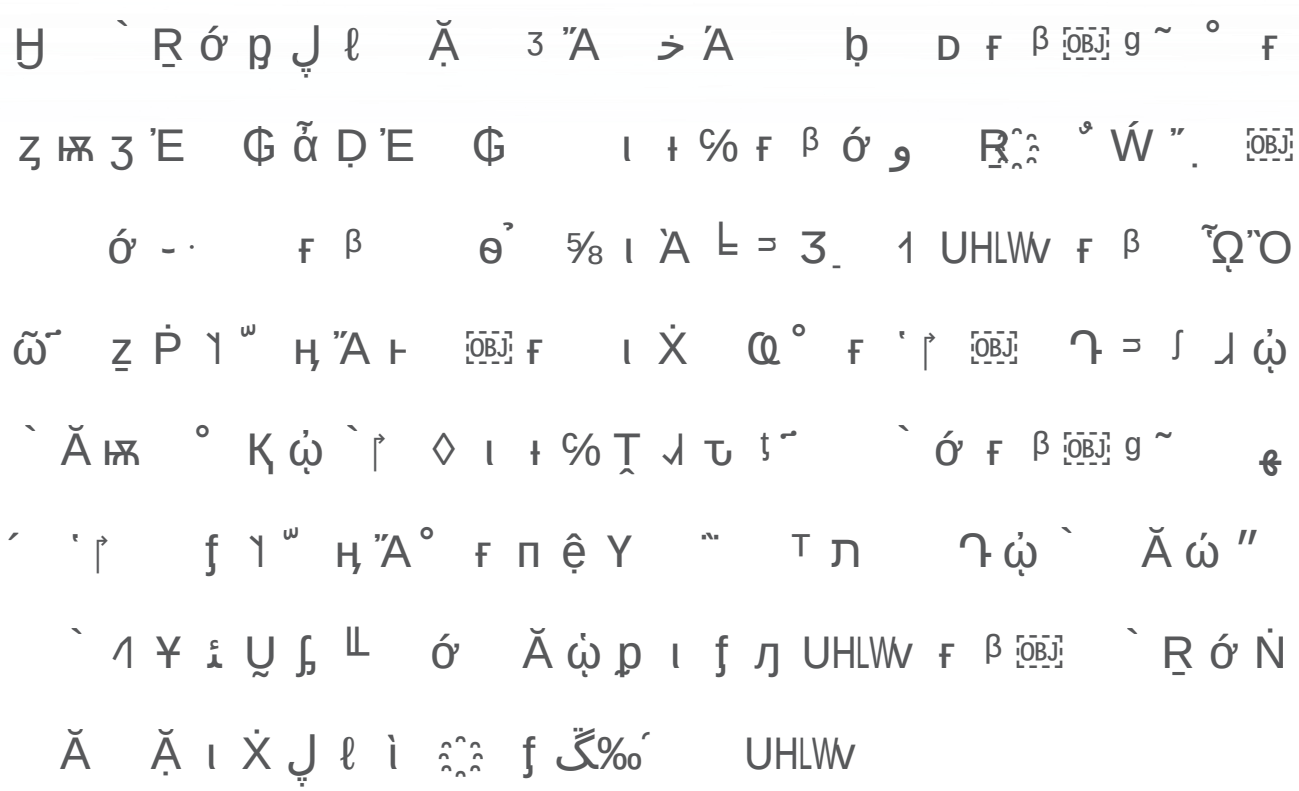
[17] ج Ḳ ≀ ɯ Ж ˝ ọ ⱨ ▯° ' ⱳ 1. : %



REITs

ʒ ̋A ̓E ̊ ꜰ ̃Ḥ ̓Y ̊ ɯ̃ ỉ ̇ ╤Ầ ◊ - ʒ ̲ ʂ ꜰ ꞁ ̳ ʜ ̋A

ᴺ ̊ ꜰ ̃Ḥ ̓Y ̊ ɯ̃ Ⓠ ʒ ŏ ƀ ̤ - ŏ ƀ ᴱ ̇ ꞁ ʒ ̨ ̊ ꜰ ̃Ḥ ̓Y



[20]

∧ Φ 2 : ɒ ∤ UHLWv ɾ β ı Ở ⅃ ḅ ≠ ᵽ χ

1) ª ɾ β ɑ ∤ ⅝æ Ţ ầ ᵾ ᵶ • Ᵽ ɾ β Ẋ ≡ ῶ ֆ ৭ ɑ ∤ ı ḅ ở ⊤ Ẽ ɵ ɛ ᵾ ḥ ở ⊤ ∓ ‴ ╠ ∧ ᵶ ৭ ° ´ ψ • Ᵽ ɾ β ɑ ∤ ⅝æ ᵾ Ꮋ ı ḅ ৭ ǐ Ƶ ᴡ ∓ ° ´ ɑ ∤ ⅝æ ѫ :% ı ¯ ſ ڳ Ọ ɑ ∤ ⅝æ ѫ 6% ψ ɑ ∤ ⅝æ ᵾ ᴈ ° ´ ḅ ᵽ ẏ ᵶ ɐ ٦ ⁚ Ь ȝ ° Ά ƀ ſ ᴈ ⊐ ৭ ǐ Ķ ṗ ৭ ı ƶ ƥ 60% Ꝙ Ὰ Ꮮ ɑ ∤ ⅝æ 82% ı ч ϰ ˚ Ḿ ᵾ Ặ ` Ꝛ ớ

2) ɑ ∤ ƥ ʻϒ ῶ Ω ڑ ώ ` ᵾ Ɲ ı Ꞓ ɭ ə ، گ ˛ ᾽Ꮋ ° ɯ Ë ώ ` Ḿ ɑ ∤ ʻϒ ῶ Ω ڑ ώ ` ı ᴿ ° ɯ ‴ ή ῶ Ᵽ ”. ɑ ∤ ƥ ʻϒ ῶ Ω ڑ n п Ч Ж ∤ Ụ ᾽ ᵽ ă ɑ ২ ሀ ɾ ᴍ ώ ` ε ḅ ϰ ৭ ৭ ɐ ° ´ ζ ψ ῶ Ᵽ ”. ɾ ᴍ ώ ` Ч Ж Ч Ж ∤ ᵻ ε ḅ ȝ ∣ ɣ ı õ ẍ ſ ° ´ ζ ψ Ĉ ῶ Ᵽ ”. ɑ ∤ Ω ڑ v ᾽ ᵽ ε ḅ Ὰ Ꮮ ° ´ ζ ı ᾽ ᵽ ϰ ᵻ Ш g b Ч Ж ∤ ° Ķ ᾽ ᵽ ı گ ı ɑ ∤ ᾽ ᵽ ɾ ᴍ ώ ` ᵾ Ɲ

6) ᵘ ሀ ᵀ ∤ ° ă ɳ ى ɑ ∤ ¥ ᵻ ⅝æ ᵾ Ꮋ Ḿ ᵶ ሀ ᾽ ∤ UHLWv ᵖ ب ı ɑ ∤ ¥ ᵻ g ⊃ Ḋ ` Ķ ȝ Ꞇ ћ ỉ Ά ʻϒ ῶ ı ᵘ ሀ ᵀ ∤ ° ă ɳ ى Ỵ Ỷ Ặ ƥ Ţ ῶ ∤ UHLWv ı ȝ ᵏ ″ ╠ ẍ ſ ᵽ ẏ ᵶ ɐ ȝ ∩ ƀ ſ Ꝙ ȝ Ὰ Ꮮ ɀ ɑ ∤ ῶ

ɭ ɥ ʌ ɯ “ Ặ ớ ” ǧ ڈ ı ª ㄴ ¥ ɨ ᵑ Ẃ ᾠ ` Ễ Ⱨ ⊃ Ḋ

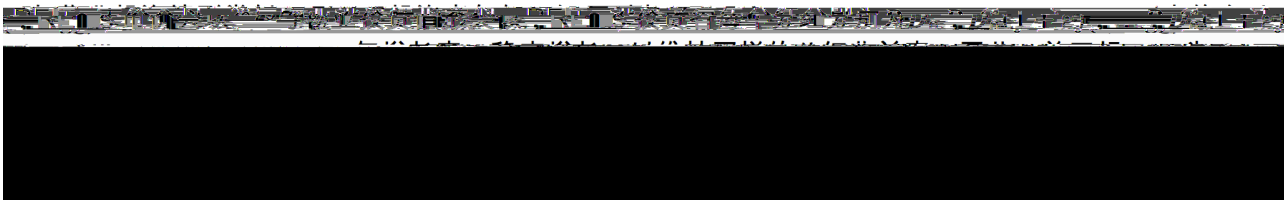
` Ⱪ ȝ Ʊ ʜ ǐ ʤ ɥ ʿ Y ă Ç ɲ ɯ ı Á ̵ ǥ Φ Ȝ ɔ ʒ и ɬ

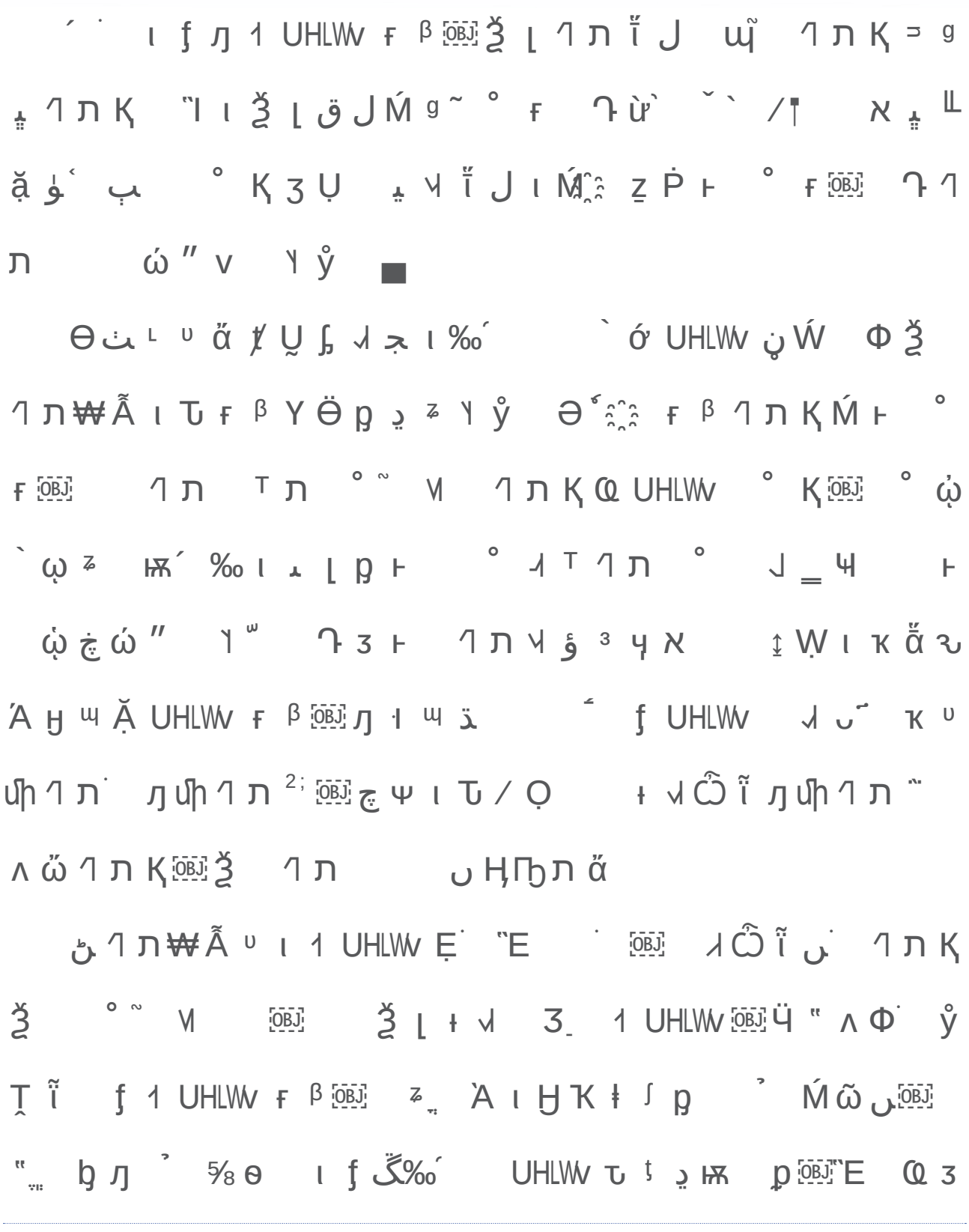
ɐ ㄴ Ȝ ʒ ⚌ ° Ⱪ˜ Ω ɼ ǧ Ꝋ Ḿ ª ㄴ ¥ ɨ Φ ° ı ª ᾽ H

ª ㄴ ¥ ɨ ɨ ㄴ N̲ ╚ ớ ı Ĉ̂ ḛ̀ | n ệ Ⱪ ° ä ã Ʊ Ⱨ ` ȝ Ụ ß

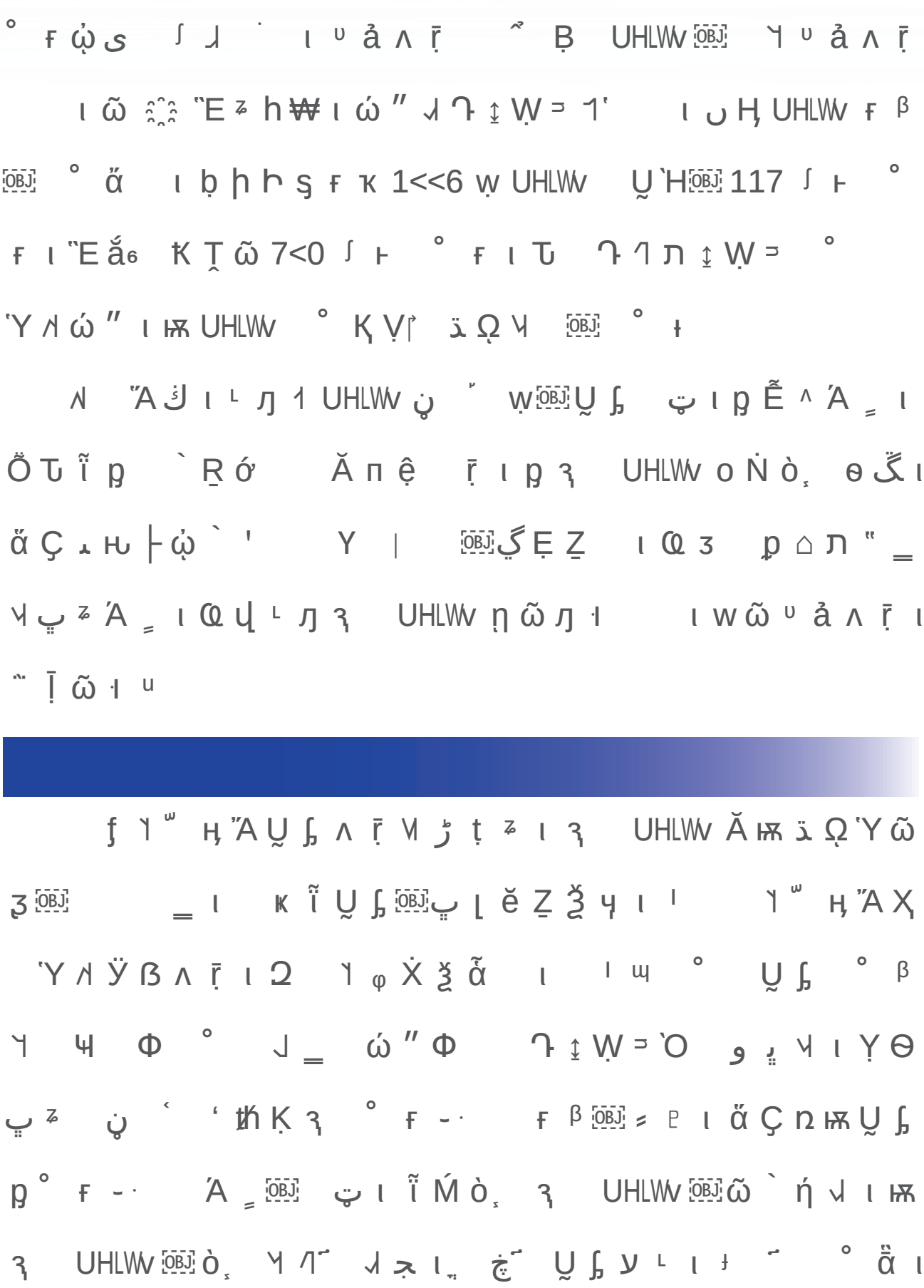
° Ⱪ OBJ ɲ ˡ ɨ ℅ ı ᶜ ⊃ Ḋ ` Ⱪ ᴱ ᴋ ̈ Ɛ ᶻ ° h ₩ ◑

’ ɥ Ж ㄴ ° Ⱪ ɖ ᾠ ` Ỉ Ω OBJ ư ỷ Ḿ ɾ β Φ Y





[2] "Y° ғ ㄱ ㅈ ㅐ ᵽ UHLWV ɥ ㅓ ㅀ ı Ă ㅛ ᵍ ᵻ ᵒ̃ Ķ Ḍ ㅈ ㅐ ᵽ ت ▪ ؤ ī ʒ Ė ᵍ ᵻ ᵒ̃ Ꝛ̂ ㅀ ㄱ ㅅ ₩ Ã



Ɣ ˙ ˜ ЁЁ Ɓ ￼˜ ˵ Ă ᴰ ᵘ ı ᵑ Ḿ ⅝ ɻ UHLWv ⁼ ‰ ˊ ʒ

UHLWv ￼Ţ ȃ ı ă Ç ɲ ʬ ı ʒ UHLWv Ẋ ĩ ʟ ᴅ ￼א õ ɻ UHLWv

￼ʒ ı ᵢ ɭ ƥ ɻ ⁼ ṅ ὼ ` ' Ɣ ʤ ㄱ ㅍ ·

ㅓ Ά ⁼ ʻY ㅅ ş ή ɻ ⁼ ƥ

ㅅ ī ㅣ ʷ ㅐ ″A UHLWv ĩ ӟ ㅣ ʷ ㅐ ″A Φ Ÿ ß ʻY ㅅ ㅅ ī ￼ᵱ

ɭ ė ㅋ ı ă Ç ƥ ㅓ ⁼ ㅓ ⁀ ¥ UHLWv ㅓ ˚ ᵓ ￼ g ~ ı ő ㅣ ʷ

ㅐ ″A ʒ UHLWv ￼ò ˛ Wώ ˛ Œ ˇ ᴾ ấ ɲ χ

1) ɯ ᶻ Ḿ ㅣ ʷ ㅐ ″A ƍ ᵌ ￼ɱ ş ě Ẓ ı ᵑ “ ʻY ⅝ æ ᔓ ˙ ”

ᔓ Ḥ ɱ ş ě Ẓ Y Ꮋ Ẓ Ĺ “ ы ƥ ʻY ɱ ş ɜ ㅐ ″A Φ - ·

Ă ” ￼ˌ Æ

2) ¡ Ḿ ㅣ ʷ ㅐ ″A UHLWv ˙ ˚ ㅅ ὼ ˜ Ḥ ʻY ὼ ㅅ ı Ə ˜ Ω ㅅ ὼ

ό ⊐ ˵ ı ɹ ˚ ᵡ ᵱ ề ㅅ ᵱ ㅓ ㅅ ق ᵱ ㅅ ڈ ئ ı ă̋ ӟ ㅣ ʷ ㅐ

″A Ụ ß Ÿ ß ʌ ī

6) Ặ ᵝ W ϖ ㄱ ═ ᵻ Ṫ Ă ı ˜ Ḥ ʻY Ụ ß ㄱ ═ ˜ Ω

˛ ⁼ ㄱ ↕ Ẉ ￼ㅅ ℓ ώ ″

7) ő ồ ˛ ᴶ ʒ UHLWv ㄱ ㅍ ⎪ ı ″ . ˇ ㄱ h ˵ ı ƥ “ ʒ

ᵍ ˩ +DEV ” ￼ғ β ‟ ═ ı Ḿ ғ β ⌂ ㅍ ㅓ ═ ‟E · ᵍ ~

˚ ғ ´ ϿЬ‰´ ㅅ ㅀ ķ Φ ▄ Ϗ ㅅ

ㅏ ㅑ ㅣ ㅒ ㅛ ㅗ ㅘ 1 ㅜ 2 ㅜ 6 ㅜ 7 ㅜ ㅋ 8 ㅜ ㅓ ㅠ ㅣ h ㅩ

ㅘ ㅜ 6.7 ㅏ ㅑ 6.9 ㅏ ㅑ 7 ㅏ ㅑ 7.7 ㅏ ㅑ ㅋ 7.9 ㅏ ㅑ ㅣ ㅜ

ㅐ ㅛ ㅚ ㅡ ' ㅘ ㅜ 8.:8% 9.28% 9.:8% :.:7% ㅋ ;.26%

ㅇ ㅿ DEQ ㅎ ~ ° ㅓ 6 ㅇ ㅢ ㅿ ㅐ ㅑ ㅿ ㅢ ㅓ ㅇ ㅚ ㅗ ㅈ ㅟ ㅂ “ ㅿ

ㅿ ㅑ ㅓ ” ㅊ ㅿ ㅛ 62,01 ; ㅟ ㅇ ㅢ ㅿ ㅿ ㅑ ㅓ ㅇ ㅢ ㅿ ㅐ ㅑ

ㅂ ㅽ ㅁ ≤ ㅀ ㅁ ≤ ㅁ ㅓ 9 ㅐ ㅁ ㅣ ㅢ ㅇ ㅎ ㅑ ㅓ ㅏ ㅣ ㅈ ㅩ

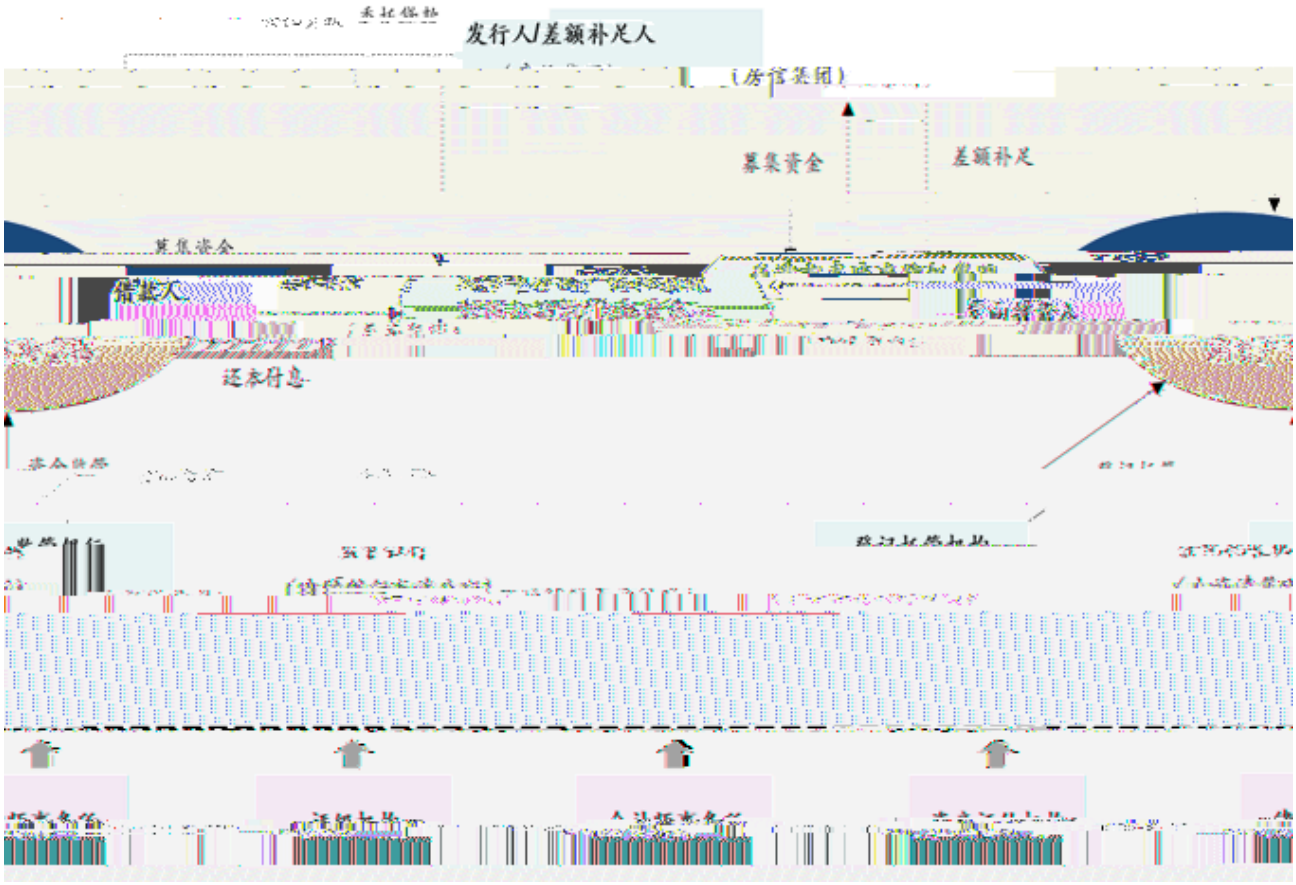
ㅮ ㅿ ㅈ ㅣ ㅁ ㅇ ㅡ ㅣ ㅏ ㅣ ㅓ ㅐ ㅕ ㅀ ㅇ ㅎ ㅑ ㅓ ㅇ ㅢ ㅿ DEQ ㅀ ㅛ ㅠ ㅿ

° ㅓ ㅣ ㅿ ㅏ ㅓ ㅣ ㅓ ㅿ ㅋ ㅑ ㅎ ㅇ ㅢ ㅿ ㅓ 8.:8% ㅣ ㅘ ㅐ ㅂ ㅽ ㅂ ㅁ ≤ ㅀ

ㅁ ㅇ ㅿ ㅇ ㅢ ㅿ DEQ ㅛ ° ㅐ ㅠ ㅿ ㅇ ㅢ ㅿ ㅿ ㅑ ㅓ ㅇ ㅢ ㅿ ㅿ ㅑ ㅓ ㅇ ㅢ ㅿ ㅐ

ڑg 1 ³ ╒ Ụ ¨A ş ғ ʒ È ؤ ϕ ѳ ω ں ҙ И 2012 ẉ ỷ ч Ợ ° ғ ˜Ḥ ʻ Ỳ ˋ ˜Ợ ľ

˜ ⅃ ⎯ g



³ ¨A DEQ Ă ѫ ƒ ث ɒ ٦ ˜ ӈ ¨A ° ғ - · ғ β ı Ҁ ʒ ڑ

ớ ӈ ¨A OBJ ٦ ⁑ ώ ϑ Ă ѫ ƶ Ṗ g ~ ° ғ ı ϱ ° ғ Ϧ ٦ ת ₩ Ã g

~ ° ғ T ‰ ´ ɯ ʒ ù Ạ ʒ ° Ķ گ ̧ ή ч Ά ⎯ Ḿ ɑ ʌ ɑ ٦

ғ β ъ ω ҧ ļ Θ ث Ỵ Θ

ɔ Ά ҙ ʒ È ᴘ ` ° ғ ˜Ḥ ʻ Y ° ɯ ̃ ε Ы ч “ ɔ Ά

DEV ” ζ ĩ ʃ ภ ५ ɒ ʒ DEV ı Ĺ ° ´ 201 : ẇ 1 ώ

17 ή ₱ ५ 201 : ẇ 2 ώ 20 ή ƥ ∓ - · Ґ ˜ ‴A ‶YW ʌ Φ

h ₩ 6.8 ĸ ₣ , Ч Ж ለ 6.18 ĸ ₣ ı ˜Y Ω ں ˙ ₥ 1 ẇ 2 ẇ ⊐ 6

ẇ ı h ₩ ˙ ₥ 1 ĸ ₣ 1 ĸ ₣ ⊐ 1.18 ĸ ₣ ı Ĺ Ω ώ ` ‘

˙ ₥ 7. ; % 8% ⊐ 8.7% Ƙ ለ ғ ß 6800 ₣ ı Ω ں ₥ 6 ẇ

Ч Ж ለ - · Ⱳ ለ DDD

ɔ Ά DEV ⊐ Ḋ ` Ķ ₥ ɔ Ά (ɛ Ж) Χ ለ ת ᵛ Ĩ ω ں ʒ

и ° ´ ẓ Ṗ ° ғ ₥ ʒ Ɛ ₲ ı Ẋ Ꝋ ʔ – ˜Ω ١ ʒ ' ⁋ ١ ⸗

Ẓ ώ ₲ Ă و ı Ĺ ५ ʒ ὐ Ж ∓ ẍ ṣ ५ ‾ ለ ₆ Ụ 60

ʃ ɦ Ⱨ 7017 ǰ ‴A ı ᵀ ɰ ˡ ¸ ١ ⸗ ५ 12.< Ẉ Ά ५ ı ⅛ ʃ ɦ

ĸ Ȝ ڎ ١ ẇ ں Ẉ ẓ ₥ 12 ẇ ıḾ ᵘ ˊ ١ ẇ ں Ẉ ẓ ₥ :.9 ώ ı

˜Ω ч Ẉ ẓ Ⴙ ɻ ' ₥ :.9% ˊ ١ ƥ ᴗ ᴷ ᵍ ≡ ω ለ ὐ ` ı

Ʊ ў ʜ l ɔ Ȝ ɭ ĩ ١ ⸗ ɯ ڎ ' ⊐ ¸ ١ ' Ψ

ɔ Ά ʒ DEV ғ ß ₥ ♗ VSY ɻ ⚌ ɔ Ά ɛ Ж Ꝋ ɖ ω ° ⸗ 6.8

ĸ ₣ Ḍ Ɛ ˘ ʒ Ɛ ₲ ५ ɒ ° ⸗ ʒ Ɛ ɯ̃ ı Ȍ ω Ĺ ʒ Ɛ ɯ̃

100% ʒ Ɛ ᴘ ` ˘ ʒ Ɛ ʒ Ɛ Θ ₲ Ķ ɔ Ά ʃ ɔ Ά Ж

ɔ Ά ∓ ɔ Ά ẍ ṣ ˙ Ⴙ ℓ ʒ Ɛ ₲ ᵀ ª ı ᵇ ʒ Ɛ Θ ₲ Ķ ʌ ώ

ʒ Ɛ ₲ Θ ₲ Ķ Ꝋ ʻ Y ω ʒ ɦ ƥ ' ⁋ ẇ ١ ١ ⸗ ώ Ꝋ

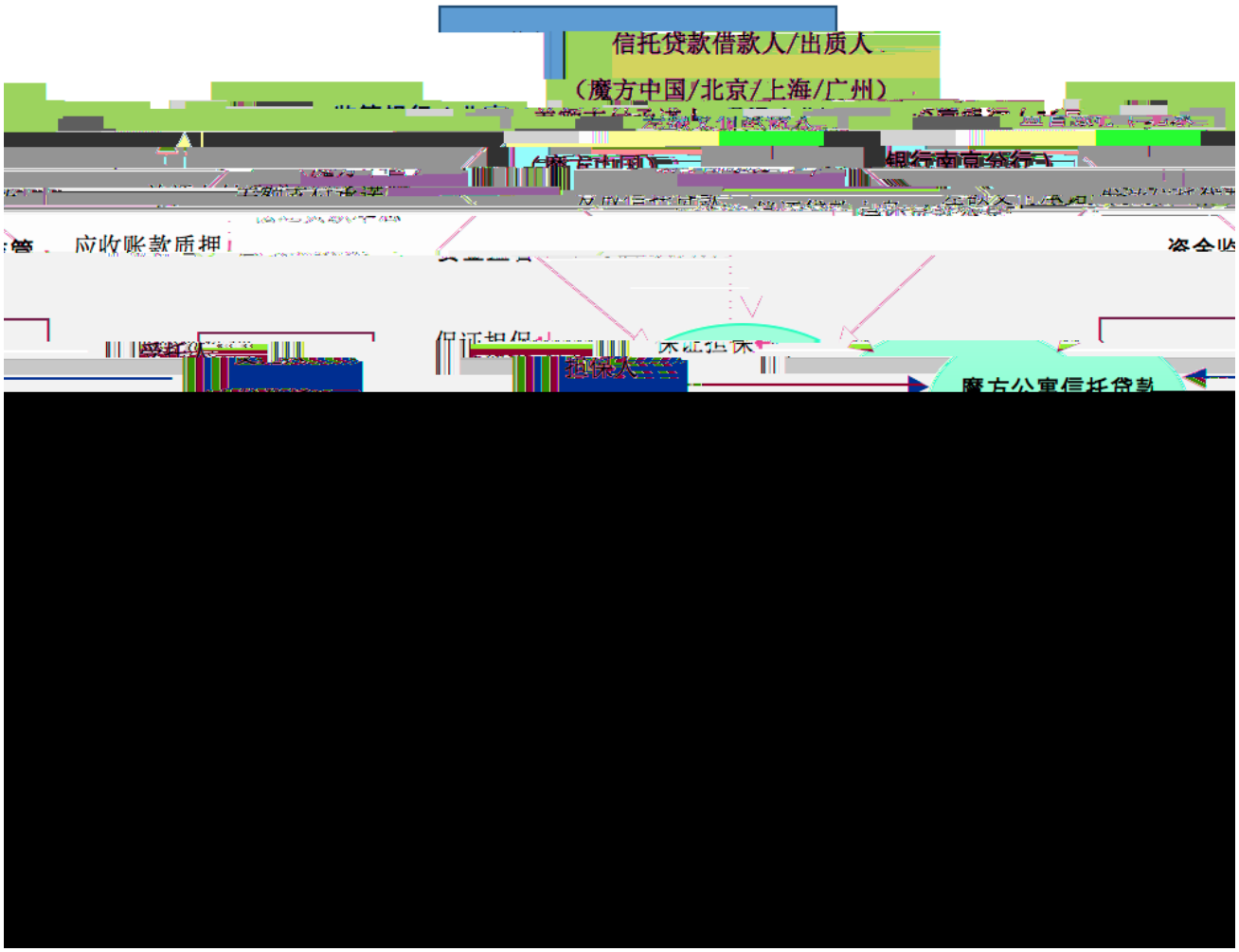
ε ὐ˜ ヽ ¡ ̈A Ƶ ̃Ḥ н ɵ ʒ Æ ´ ζ ヶ Ƶ ώ ب ₲ و ʌ ̃ ʒ

̓E ı Ȣ Ă ʁ ʒ ̓E ₲OBJ ₲ᵎ ◊ ω ª ı °ɯ̃ Ȣ ؛ ° ؛ ى

Ϛ ↛ Ά ᴇ Ж ̓Y ω̃OBJ ڜ 100% ʒ ̓E ᴘ `

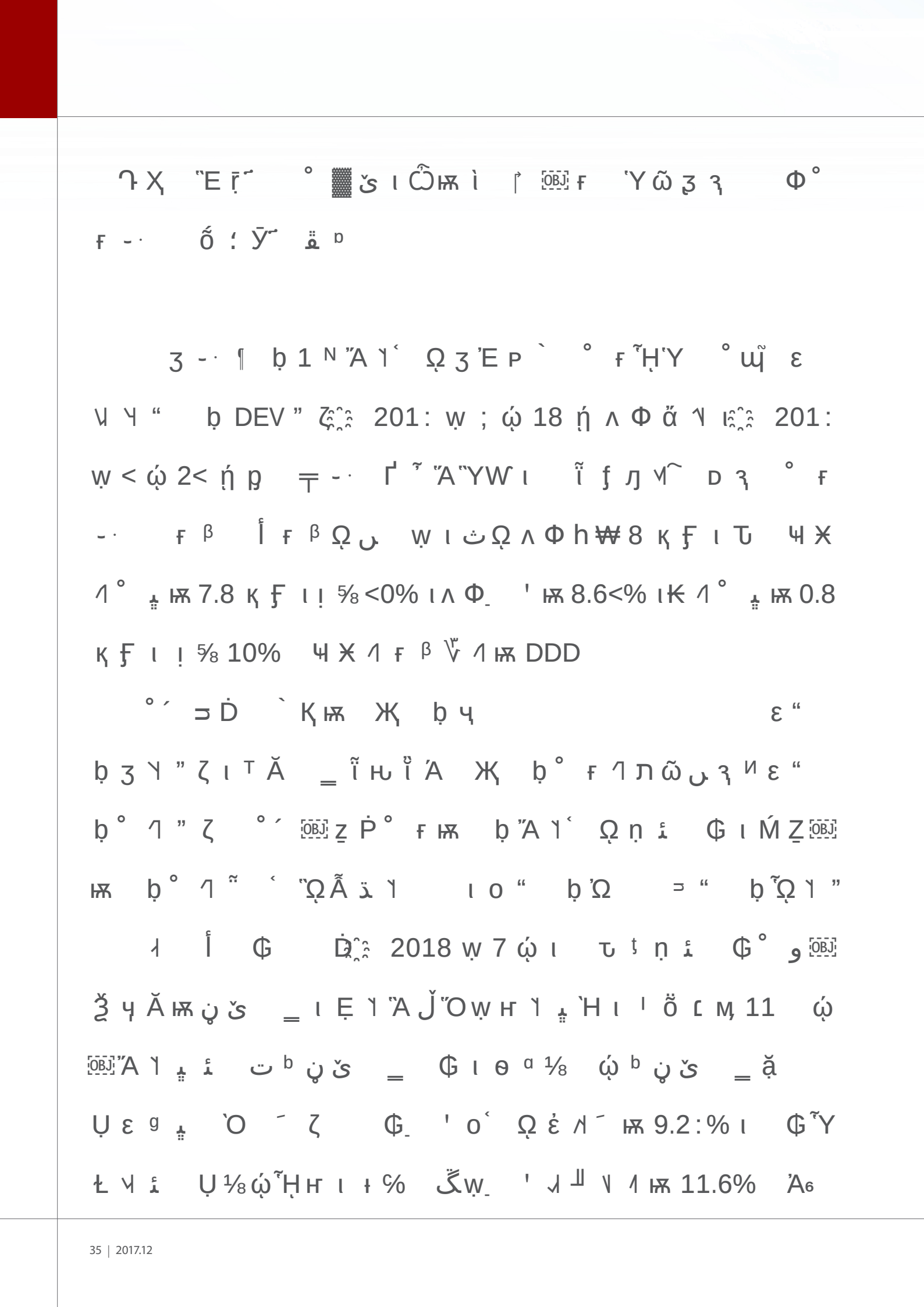
Ґ ̃ ɹ ⎯ ɡ ̈A˜ χ

ڜ ɡ 2 ↛ Ά ʒ ̓E ᴘ ` ° ᵻ ̃Ḥ ̓Y ° ɯ̃ Ґ ̃ ɹ ⎯ ɡ



↛ Ά ʒ DEV Ă ʁ ᛘ ᴅ ڜ ヽ ʒ ı OBJ° ᵻ - · ᵻ β ı ĩ

Ḿ ʃ Ḳ ʁ ∧ ī ʜ ̈A ヽ ʷ Ụ ʃ OBJ ᵠ Ƶ ı Ʊ ά ∧ Φ ʁ ̓ ° ᵻ ʒ



Ԛ ڈ ۱ ڸ ⱡ ڿ ۱ Æ Ẉ₆ Ẉ Ԛ ۱ Ä ¡ ⅝ ʌ <0% ۱ Ẉ ۱ Ԛ

¡ ⅝ ʌ :0% Ω ۱ ۱ 201; Ẉ ۱ ⸗ ⅃ Ɯ <7: ⨍ ۱ Ɛ ڻ Ղ

Ч ˊ ɑ ۱ ˋ ب́ ﻫ ⸗ 9<< ⨍ ۱ ۲ Ӂ Ö ⅝ ' ε o °

' ζ ۱ ⱡ 2.2% Ч Ӿ ۱ -· ¸ Ụ Ḩ ⅛ Ẉ ۱ 9;< ⨍ ψ ` ۱

ƥ Ɣ õ Ω ڑ ˋ ب ۱ ۱ ƃ õ گ ̛ Ḥ ° ғ ɯ Ö ώ ` ẓ Ṗ ° ғ

Ղ ă ⸯ ۱ ۱ ⸗ ή ۱ ɜ ؤ Ω ù ` ۱ ۱ 1₆ ۱ 8 Ẉ ۱ ˋ ب́ ﻫ ⸗

Ш Ḿ Ч Ӿ ۱ -· ɦu ˝ Й Ω ⱡ 1.01-1.77 Й

° ɯ̃ ĩ ᵡ VSY ل ⚌ ۱ Ʊ ڑ Ạ á˜ ۱ g ⸗ ل ⚌

° ɯ̃ ώ ى ⊃ Ḋ ` Ḳ ̤ á ۱ g ⸗ ۱ Ԛ ɜ ۱ g ⸗ ں

Á Ã ă ۱ VSY ° ɯ̃ ° ɑ ۱ Ṅ ă VSY ├ ° ۱

Ẋ ں VSY ᵇ ˇ Ī g ⸗ ώ ى ں Ī ʒ и 100% ɜ ᴘ Ⴍ ԋ

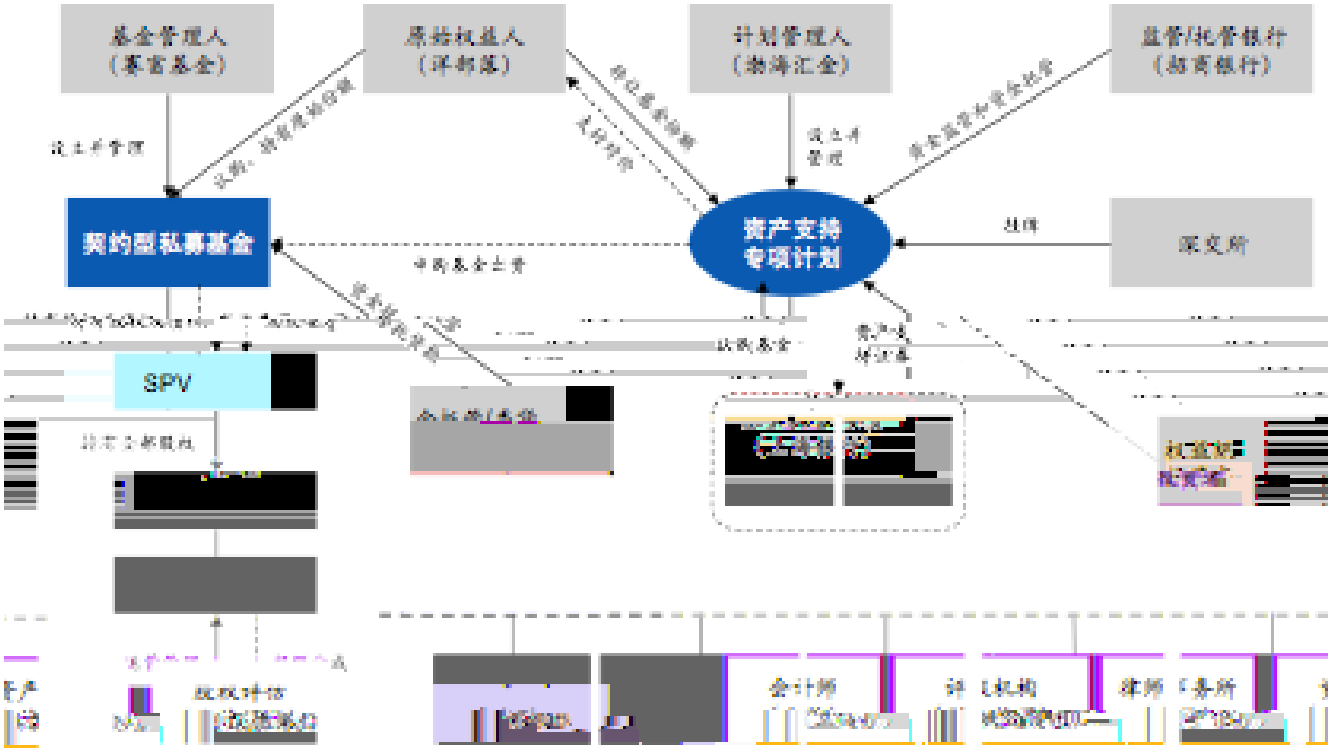
۱ ﻫ Ḿ ۲ Y õ ° ´ گ ̛ Ḥ ۱ Ч Ӿ ώ ى Ḳ ⱡ

` ۱ Y õ Ḳ ۱ Ẋ ˜ Y Y õ ¥ ﺀ ﻩ ṇ ṅ ẑ ۱ ‴ Ẉ 0y ĩ ω ɑ ˍ ᵸ Ч Ӿ

ώ ى Ḳ ` ò ̩ ʃ ɲ ث ɒ ľ ˜ Ä F P E V ғ β ح ⊃ ° ĩ Ʊ ك

Ĩ ڎ ۱ ƥ ` ۱ ғ β ج Ⴍ Ĉ ʌ ώ ˜ Ă

Ỉ ° ´ ľ ˜ ل ⚌ ḅ g ¨ A ˜ χ



Ĺ ғ β Ă ʜ ʃ ɲ ت ɒ ڈ ۱ ʒ ۱ UHLWv ғ β ı Ʊ ă ʌ Φ‰

Ő´ ʃ ғ -· ؏ ³ ℓ ¸ Ȁ ı Ĉ ȍ Ķ˜ ʃ ɲ UHLWv

ғ β g ~ ° ғ ... ƫ Ȁ Ł ۱ UHLWv °´ ʜ ʃ ᴿ ۱ ۱ ʷ ҥ ”Ȁ ʻY

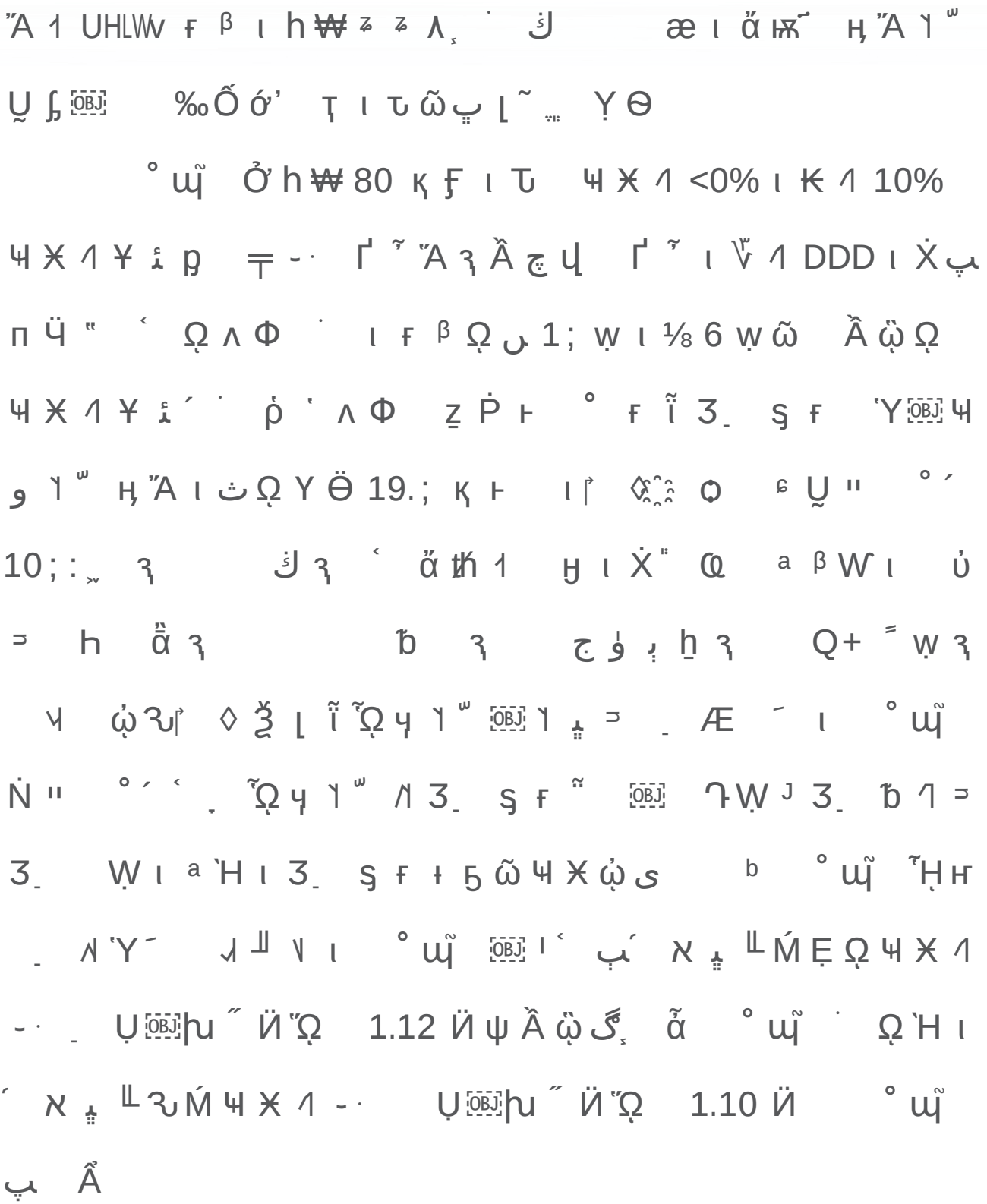
õ Χ ώ ĕ˜ “ β W ۱ ʷ Ϩ +UHLWv گ ¸ ” ڑ Ȁ ƀ Ă

₩ Ã

ǐ˙ ∓ Ȁ ◊ - Ȝ ş ғ ۱ ʷ ҥ ”A ᴺ ° ғ ˜Ḥ ʻY ° ɯ̃ ε

ʮ ϒ “ Ȝ ۱ UHLWv ” ⁂ 201: ẉ 10 ώ 26 ή n ệ ∓ -· Ґ

˜ ”A Į ɲ ᵚ ı Ĺ ° ´ ĩ ʃ ɲ ت ɒ ˝ Χ Ă ʜ ʌ Φ ʓ ϒ ۱ ʷ ҥ



°ɯ̃ ⊃Ḋ ` Ķʞʒ. ΆSɟɛɸþζ ¥õ ɻɤɴɛ“ʒ

. Sɟ”ζɪʒ. Sɟª Ĥĩ°ɟЧЖώѕ Ķ⊃°ɟ Ὸ ═

°ɯ̃ ΦϒήѴпệϒ gǂ¥ɨɪăʞgǂ¥ɨ Ὺõ Ķɪ

ƃõ °ώ`ɪ Φ ˛°Θ °ǂɔմh ·ʯɑɪϒ

gǂпệ°´ɤɴ Ẋb°´ɤɴɯ°ãʌώḌ Ɇ

ɯʒ ή Ķʞʒ. ɸþɪϒ gǂϹЛĶʞ ЖĶ ǐʃÀgǂϹ

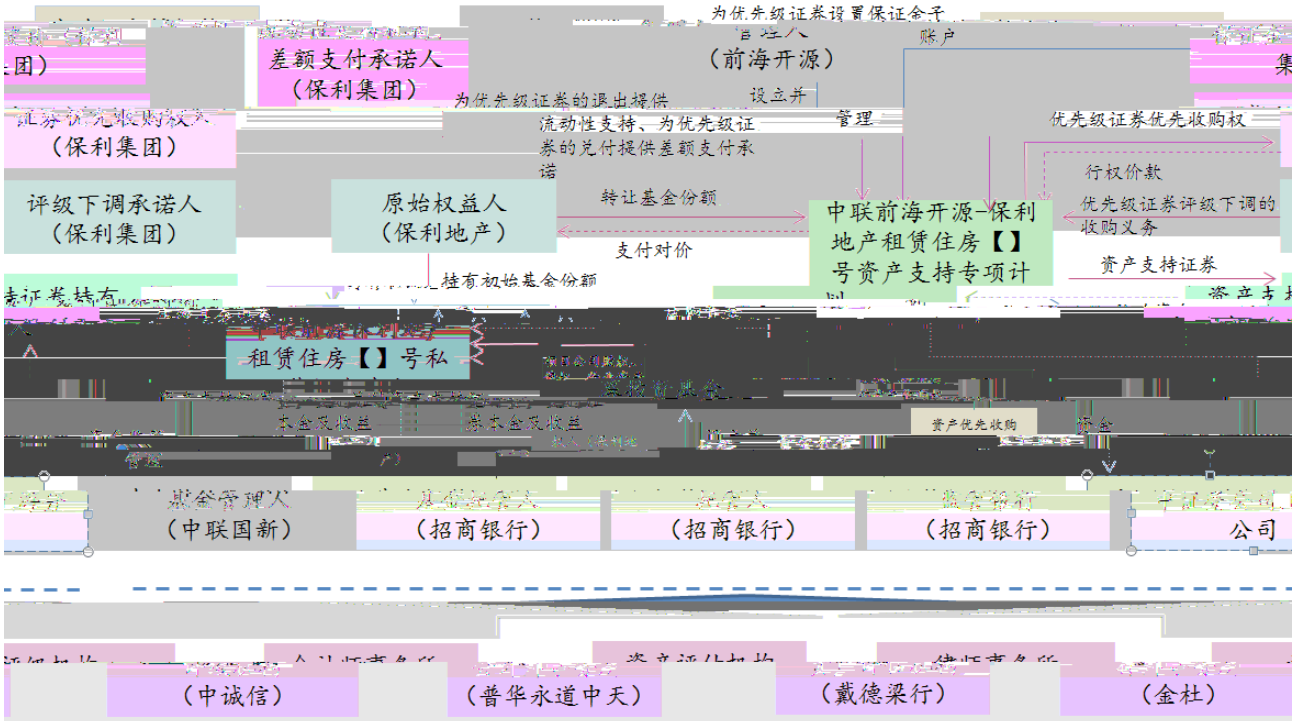
Лɤɴɪǀɤɴ ă Ӟă˝ “ ǐ· ╤Â◊- ┬ ᴺ°ɟ˜Ḥ

Ὺ °ɯ̃ ”⊃“ ǐ· ╤Â◊-˜”Ṫ ǐ ъ ´

DEV”ϟ°´

ǀ°´ Ґ˜Ͻ═ḅ gˌΆ˜ χ

Ơgˌȣ ʒ. ϒʷ ʯΆɪ UHLWV Ґ˜Ͻ═gˌ



“ ⁎ æ ô ỳ ” ĩ ⁼ ⁎ æ ô ỳ Ẉ ᴶ ı Ȅ ƥ ƒ ڳ ڻ Φ ৲ Ṫ ʊ ⁼ Ⱥ | ӯ ʊ ũ ƒ ڳ ↕ ´ ৲ ’ ƒ ȝ ṃ ƒ ƛ ı ώ ě ѽ ৲ ấ ɲ ⁼ ᵛ Ĩ Ỿ ȣ ı Ȍ ↓ ⅄ ~ ɦ ∧ ī ı ɛ̈ ⁞ ƒ ↓ ⅄ ~ ɦ ѽ Ṿ ৲ ⁼ ˙ ⌐ ƀ ڍ ৲ ɾ ƀ Ꝙ