

**Examples of calculation of default risk exposure under the SA-CCR approach**

- ♦ The counterparty of the derivative contracts in each of the cases below is an unrated corporate that is not a small business and the AI concerned has not made use of any recognized guarantee or recognized credit derivative contract to mitigate the default risk exposure to the corporate arising from these contracts.

**Case 1: Unmargined contracts not covered by recognized netting**

In this case, since the derivative contracts entered into by the AI with the corporate are not covered by recognized netting, each contract forms a single netting set. Also, neither the AI nor the counterparty has posted collateral for the contracts.

Netting set A

Contract	Type of contract	Base currency	Notional (HK\$'000)	Residual maturity (in year)	Pay	Receive	Market value (HK\$'000)
A1	Interest rate swap	HKD	10,000	0.25	Fixed	Floating	10

Netting set B

Contract	Type of contract	Base currency	Notional (HK\$'000)	Residual maturity (in year)	Pay	Receive	Market value (HK\$'000)
A2	Interest rate swap	HKD	10,000	5	Floating	Fixed	-25

Netting set C

Contract	Type of contract	Base currency	Notional (HK\$'000)	Residual maturity (in year)	Reference entity	ECAI issuer rating of reference entity	Position of the AI	Market value (HK\$'000)
A3	Credit default swap	HKD	10,000	2	Firm X	BBB	Protection seller	50

## I. Calculation of default risk exposure

Step 1: Calculation of replacement cost (RC) at the level of netting set

$$RC = \max (V - C; 0)$$

$$RC_{\text{netting set A}} = \max(10 - 0; 0) = 10$$

$$RC_{\text{netting set B}} = \max(-25 - 0; 0) = 0$$

$$RC_{\text{netting set C}} = \max(50 - 0; 0) = 50$$

Step 2: Calculation of add-on at the level of netting set

*Step 2.1: Calculation of contract-level adjusted notional amount ( $d_i$ )*

Contract	Hedging Set	$S_i$	$E_i$	Notional amount (HK\$'000) (a)	Supervisory duration ( $SD_i$ ) (b)	Adjusted notional amount ( $d_i$ ) (HK\$'000) = (a) × (b)
A1	HKD	0	0.25	10,000	0.248	2,484
A2	HKD	0	5	10,000	4.424	44,240
A3	NA	0	2	10,000	1.903	19,033

The supervisory duration of contract  $i$ , which is subject to a floor of 10 business days, is calculated as follows:

$$SD_i = \frac{\exp(-0.05 * S_i) - \exp(-0.05 * E_i)}{0.05}$$

$$SD_{A1} = \frac{\exp(-0.05*0) - \exp(-0.05*0.25)}{0.05} = 0.248$$

$$SD_{A2} = \frac{\exp(-0.05*0) - \exp(-0.05*5)}{0.05} = 4.424$$

$$SD_{A3} = \frac{\exp(-0.05*0) - \exp(-0.05*2)}{0.05} = 1.903$$

*Step 2.2: Calculation of effective notional amount (D<sub>i</sub>) at the level of hedging set*

For unmargined contract *i* not subject to recognized netting, the effective notional amount of a hedging set is equivalent to the effective notional amount of contract *i* and is given by the following formula:

$$D_i = \delta_i * d_i * MF_i^{(unmargined)}$$

where  $MF_i^{(unmargined)}$  is the maturity factor applicable to contract *i* given by the following formula ( $M_i$  is subject to a floor of 10 business days):

$$MF_i^{(unmargined)} = \sqrt{\frac{\min\{M_i; 1 \text{ year}\}}{1 \text{ year}}}$$

$$MF_{A1}^{(unmargined)} = \sqrt{\frac{\min\{0.25; 1\}}{1}} = 0.5$$

$$MF_{A2}^{(unmargined)} = \sqrt{\frac{\min\{5; 1\}}{1}} = 1$$

$$MF_{A3}^{(unmargined)} = \sqrt{\frac{\min\{2; 1\}}{1}} = 1$$

<b>Contract</b>	<b>Residual maturity (M<sub>i</sub>)</b>	<b>Supervisory delta (δ<sub>i</sub>)</b> (a)	<b>Adjusted notional amount (d<sub>i</sub>)</b> (HK\$'000) (b)	<b>Maturity factor (MF<sub>i</sub>)</b> (c)	<b>Effective notional amount (D<sub>i</sub>)</b> (HK\$'000) = (a) × (b) × (c)
A1	0.25	+1	2,484	0.5	1,242
A2	5	-1	44,240	1	-44,240
A3	2	-1	19,033	1	-19,033

*Step 2.3: Calculation of add-on at the level of netting set*

For an interest rate<sup>1</sup> or credit-related<sup>2</sup> derivative contract not covered by recognized netting, the add-on for the netting set concerned is calculated as follows:

$$AddOn = SF * |D_i|$$

Netting set	Contract	Absolute value of effective notional amount ( $ D_i $ ) (HK\$'000) (a)	Supervisory factor (SF) (b)	Add-on (HK\$'000) = (a) × (b)
A	A1	1,242	0.5%	6.21
B	A2	44,240	0.5%	221.20
C	A3	19,033	0.54%	102.78

Step 3: Calculation of potential future exposure (PFE) and default risk exposure at the level of netting set

$$PFE = multiplier * AddOn$$

$$Default Risk Exposure = alpha * (RC + PFE)$$

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<sup>1</sup> For a netting set that contains only one contract, if the contract is an interest rate contract, Formulas 23AS and 23AT in §226BU(2) of the BCR should result in the same effective notional amount for the contract. That is-

$$Effective\ Notional^{(IR)} = |D^{(MB)}|$$

where  $D^{(MB)}$  is the effective notional amount for the maturity bucket in which the contract falls. However, since there is only one maturity bucket in the netting set, the actual calculation does not require allocation of the contract into a maturity bucket.

<sup>2</sup> For a netting set that contains only one contract, if the contract is a credit-related derivative contract, Formula 23AQ in §226BT(3) of the BCR will be reduced to –

$$AddOn^{(credit)} = [AddOn(Entropy_k)^2]^{0.5} = AddOn(Entropy_k) = SF_k^{(Credit)} * Effective\ Notional_k^{(Credit)}$$

<b>Netting set</b>	<b>RC (HK\$'000)</b>  (a)	<b>Multiplier</b>  (b)	<b>Add-on (HK\$'000)</b>  (c)	<b>PFE (HK\$'000)</b>  (d) = (b) × (c)	<b>Default risk exposure (HK\$'000)</b>  =1.4*((a) + (d))
A	10	1	6.21	6.21	22.69
B	0	0.945	221.20	209.03	292.65
C	50	1	102.78	102.78	213.89
<b>Total</b>					<b>529.23</b>

The multiplier applied to each of the above netting sets is calculated as follows:

$$multiplier = \min \left\{ 1; Floor + (1 - Floor) * \exp \left( \frac{V - C}{2 * (1 - Floor) * AddOn} \right) \right\}$$

For both netting sets A and C, since the current market value of the netting set is positive and no net collateral is held by the AI, the multiplier is equal to 1.

For netting set B–

$$multiplier_{netting\ set\ B} = \min \left\{ 1; 5\% + (1 - 5\%) * \exp \left( \frac{-25}{2 * (1 - 5\%) * 221.2} \right) \right\} = 0.945$$

## II. Reporting arrangement

### Division A - RWA

#### a. Part IIIa

(in HK\$'000)

Item	Nature of item	On-balance sheet exposures	Off-balance sheet exposures				
		Principal Amount (A1)	Principal Amount / Notional Amount (A2)	Credit Equivalent Amount (A3)	Default Risk Exposure (A4)	Risk-weight % (A5)	Risk-weighted Amount (A6) = (A1+A3+A4) x A5
<b>Class XII</b>	<b>Other Exposures</b>						
12a.	Exposures to corporates or individuals not elsewhere reported		30,000		529	100	529
12b.	Premises, plant and equipment, other fixed assets for own use, and other interest in land					100	
12f.	Other exposures not elsewhere reported						
12f(i).							
12f(ii).							
12f(iii).							
12f(iv).							
<b>SUBTOTAL</b>			<b>30,000</b>		<b>529</b>		<b>529</b>

#### b. Part IIIb

(in HK\$'000)

Item	Nature of item	On-balance sheet exposures		Off-balance sheet exposures			Risk-weight % (A6)	Risk-weighted Amount (A7) = (A2+A4+A5) x A6
		Principal Amount (A1)	Principal Amount after CRM (A2)	Principal Amount / Notional Amount (A3)	Credit Equivalent Amount after CRM (A4)	Default Risk Exposure after CRM (A5)		
<b>Class VIII</b>	<b>Corporate Exposures</b>							
8a.	Rated general corporate exposures							
8a(i).	Risk-weight 20%						20	
8a(ii).	Risk-weight 30%						30	
8b.	Unrated general corporate exposures							
8b(i).	Risk-weight 85%						85	
8b(ii).	Risk-weight 100%			30,000		529	100	529
8b(iii).	Risk-weight 150%						150	
<b>SUBTOTAL</b>				<b>30,000</b>		<b>529</b>		<b>529</b>

## Division B – Default risk exposure amount

### a. Part IIIa Division B - III

(in HK\$'000)

Item	Nature of item						
19.	Unmargined contracts not covered by recognized netting						
					Out of which:		
	Type of Contract	Total Notional Amount (B18)	Total Replacement Cost (B19)	Total Potential Future Exposure (B20)	Total Default Risk Exposure (B21)	Sovereign exposures (B22)	Exposures to corporates or individuals (B26)
19a.	Interest rate contracts	20,000	10	215	315		315
19b.	Exchange rate contracts						
19c.	Credit-related derivative contracts	10,000	50	103	214		214
19d.	Equity-related derivative contracts						
19e.	Commodity-related derivative contracts						
	<b>SUBTOTAL</b>	<b>30,000</b>	<b>60</b>	<b>318</b>	<b>529</b>		<b>529</b>

### b. Part IIIb Division B - II

(in HK\$'000)

Item	Nature of item							
12.	Unmargined contracts not covered by recognized netting							
					Out of which:			
	Type of Contract	Total Notional Amount (B13)	Total Replacement Cost (B14)	Total Potential Future Exposure (B15)	Total Default Risk Exposure (B16)	Sovereign exposures (B17)	Corporate exposures (B22)	Retail exposures (B23)
12a.	Interest rate contracts	20,000	10	215	315		315	
12b.	Exchange rate contracts							
12c.	Credit-related derivative contracts	10,000	50	103	214		214	
12d.	Equity-related derivative contracts							
12e.	Commodity-related derivative contracts							
	<b>SUBTOTAL</b>	<b>30,000</b>	<b>60</b>	<b>318</b>	<b>529</b>		<b>529</b>	

**Case 2: Margined contracts not covered by recognized netting**

In this case, the netting sets include netting sets A and B in Case 1 and the following netting sets:

Netting set D

Contract	Type of contract	Entity	Number of units referenced by the contract	Strike (HK\$)	Residual maturity (in year)	Current price of underlying (HK\$)	Market value (HK\$'000)
A4	Bought equity call option (European style)	Firm B	1,000	245	0.25	234	11

Netting set E

Contract	Type of contract	Notional (US\$'000)	Contract rate	Residual maturity (in year)	Market value (HK\$'000)
A5	Long FX forward (USD/CNH)	1,000	6.6248	0.4	16

The four netting sets are subject to the same margin agreement with the following details:

(in HK\$'000)

Margining frequency	Threshold	Min. Transfer Amount	Independent Amount	Haircut value of net collateral held by the AI
daily	0	5	450	500

**I. Calculation of default risk exposure**

Step 1: Calculation of replacement cost (RC) of netting sets covered by margin agreement MA

$$RC_{MA} = \max \left\{ \sum_{NSEMA} \max\{V_{NS}; 0\} - \max\{C_{MA}; 0\}; 0 \right\} \\ + \max \left\{ \sum_{NSEMA} \min\{V_{NS}; 0\} - \min\{C_{MA}; 0\}; 0 \right\}$$

Contract	$\max\{V_{NS}; 0\}$	$\min\{V_{NS}; 0\}$
A1	10	0
A2	0	-25
A4	11	0

A5	16	0
<b>Total</b>	<b>37</b>	<b>-25</b>

$$= \max\{37 - \max\{500; 0\}; 0\} + \max\{-25 - \min\{500; 0\}; 0\}$$

$$= \max(37 - 500; 0) + \max(-25; 0)$$

$$= 0$$

Step 2: Calculation of add-on at the level of netting set

*Step 2.1: Calculation of contract-level adjusted notional amount ( $d_i$ )*

<b>Contract</b>	<b>Hedging Set</b>	<b>USD leg (HK\$'000)</b>	<b>CNH leg (HK\$'000)</b>	<b>Number of units referenced by the contract</b>	<b>Current price of one unit of the underlying assets (HK\$)</b>	<b>Adjusted notional amount (<math>d_i</math>) (HK\$'000)</b>
A4	Firm B	NA	NA	1,000	234	234
A5	USD/CNH	7,774	7,881	NA	NA	7,881

*Step 2.2: Calculation of effective notional amount ( $D_i$ ) at the level of hedging set*

<b>Contract</b>	<b>Residual maturity (<math>M_i</math>)</b>	<b>Supervisory delta (<math>\delta_i</math>) (a)</b>	<b>Adjusted notional amount (<math>d_i</math>) (HK\$'000) (b)</b>	<b>Maturity factor (<math>MF_i</math>) (c)</b>	<b>Effective notional amount (<math>D_i</math>) (HK\$'000) = (a) × (b) × (c)</b>
A4	0.25	+0.588	234	0.5000	69
A5	0.40	+1	7,881	0.6325	4,984

The supervisory delta adjustment of Contract A4 is calculated in accordance with §226BZB(2) and (3) of the BCR. Spot price of the underlying equity is used in the calculation for illustrative purposes.

$$\delta_{A4} = +N\left(\frac{\ln\left(\frac{P}{K}\right) + 0.5 \cdot \sigma^2 \cdot T}{\sigma \cdot \sqrt{T}}\right)$$

$$\delta_{A4} = +N \left( \frac{\ln \left( \frac{234}{245} \right) + 0.5 \cdot 120\%^2 \cdot 0.25}{120\% \cdot \sqrt{0.25}} \right)$$

$$= +0.588$$

As there are multiple netting sets covered by the same variation margin agreement, the potential future exposure of each of Contract A4 and Contract A5 must be calculated in a manner as if the contracts were unmargined contracts (see §226BS of the BCR). Accordingly, the maturity factor of each of the contracts is calculated by using the formula for unmargined contracts.

$$MF_i^{(unmargined)} = \sqrt{\frac{\min\{M_i; 1 \text{ year}\}}{1 \text{ year}}}$$

$$MF_{A4}^{(unmargined)} = \sqrt{\frac{\min\{0.25; 1\}}{1}} = 0.5$$

$$MF_{A5}^{(unmargined)} = \sqrt{\frac{\min\{0.4; 1\}}{1}} = 0.6325$$

*Step 2.3: Calculation of add-on at the level of netting set*

<b>Contract</b>	<b>Effective notional amount (<math>D_i</math>)</b> (HK\$'000) (a)	<b>Supervisory factor (<math>SF</math>)</b> (b)	<b>Add-on<sup>3</sup></b> (HK\$'000) = (a) × (b)
A4	69	32%	22.03
A5	4,984	4%	199.36

<sup>3</sup> See footnote 2 above.

Step 3: Calculation of potential future exposure (PFE) of netting sets covered by margin agreement MA

*Step 3.1: Calculation of multiplier of each netting set*

As the same collateral is shared by four netting sets and the AI in this example is a net receiver of collateral ( $C > 0$ ), netting sets with positive market values must first be allocated collateral up to the amount of those market values. Only after all positive market values have been compensated may surplus collateral be attributed freely among all netting sets. Also, the allocated parts must add up to the total collateral available for the margin agreement. Apart from these limitations, AIs may allocate available collateral at their discretion. The following table shows the multipliers calculated by using one of the possible collateral allocations.

<b>Netting set</b>	<b>Market value (HK\$'000)</b>	<b>Collateral allocated* (HK\$'000)</b>	<b>Multiplier</b>
A	10	22.65	0.375
B	-25	0	0.945
D	11	55.90	0.375
E	16	421.44	0.376

\*The allocation is for illustrative purpose only and does not represent any preference of the HKMA.

From Case 1, the multiplier of netting set B is 0.945. The multipliers of other netting sets are calculated as follows:

$$multiplier_{netting\ set\ A} = \min \left\{ 1; 5\% + (1 - 5\%) * \exp \left( \frac{10 - 22.65}{2 * (1 - 5\%) * 6.21} \right) \right\} = 0.375$$

$$multiplier_{netting\ set\ D} = \min \left\{ 1; 5\% + (1 - 5\%) * \exp \left( \frac{11 - 55.90}{2 * (1 - 5\%) * 22.03} \right) \right\} = 0.375$$

$$multiplier_{netting\ set\ E} = \min \left\{ 1; 5\% + (1 - 5\%) * \exp \left( \frac{16 - 421.44}{2 * (1 - 5\%) * 199.36} \right) \right\} = 0.376$$

*Step 3.2: Calculation of PFE of each netting set on unmargined basis*

<b>Netting set</b>	<b>AddOn (HK\$'000)</b> (a)	<b>Multiplier</b> (b)	<b>PFE (unmargined) (HK\$'000)</b> = (a) × (b)
A	6.21	0.375	2.33

Netting set	AddOn (HK\$'000) (a)	Multiplier (b)	PFE (unmargined) (HK\$'000) = (a)×(b)
B	221.20	0.945	209.06
D	22.03	0.375	8.26
E	199.36	0.376	74.91
<b>Total</b>			<b>294.56</b>

$$PFE_{MA} = \sum_{NSEMA} PFE_{NS}^{(unmargined)}$$

$$= 294.56$$

Step 4: Calculation of default risk exposure of netting sets covered by margin agreement MA

$$Default\ risk\ exposure_{MA} = \alpha * (RC_{MA} + PFE_{MA}) = 1.4 * (0 + 294.56) = 412$$

## II. Reporting arrangement

### Division A - RWA

#### a. Part IIIa

(in HK\$'000)

Item	Nature of item	On-balance sheet exposures	Off-balance sheet exposures				
		Principal Amount (A1)	Principal Amount / Notional Amount (A2)	Credit Equivalent Amount (A3)	Default Risk Exposure (A4)	Risk- weight % (A5)	Risk- weighted Amount (A6) = (A1+A3+A4) x A5
<b>Class XII</b>	<b>Other Exposures</b>						
12a.	Exposures to corporates or individuals not elsewhere reported		28,008		412	100	412
12b.	Premises, plant and equipment, other fixed assets for own use, and other interest in land					100	
12f.	Other exposures not elsewhere reported						
12f(i).							
12f(ii).							
12f(iii).							
12f(iv).							
<b>SUBTOTAL</b>			<b>28,008</b>		<b>412</b>		<b>412</b>

b. Part IIIb

(in HK\$'000)

Item	Nature of item	On-balance sheet exposures		Off-balance sheet exposures			Risk-weight % (A6)	Risk-weighted Amount (A7) = (A2+A4+A5) x A6
		Principal Amount (A1)	Principal Amount after CRM (A2)	Principal Amount / Notional Amount (A3)	Credit Equivalent Amount after CRM (A4)	Default Risk Exposure after CRM (A5)		
<b>Class VIII</b>	<b>Corporate Exposures</b>							
8a.	Rated general corporate exposures							
8a(i).	Risk-weight 20%						20	
8a(ii).	Risk-weight 30%						30	
8b.	Unrated general corporate exposures							
8b(i).	Risk-weight 85%						85	
8b(ii).	Risk-weight 100%			28,008		412	100	412
8b(iii).	Risk-weight 150%						150	
	<b>SUBTOTAL</b>			28,008		412		412

Division B – Default risk exposure amount

In this example, the stated notional amount of the FX forward contract is USD1,000. The notional amount reported in the CAR return is the HKD equivalent of USD1,000, instead of the adjusted notional amount of the contract.

a. Part IIIa Division B – III

(in HK\$'000)

20. Margined contracts not covered by recognized netting						
Type of Contract	Total Notional Amount (B18)	Total Replacement Cost (B19)	Total Potential Future Exposure (B20)	Total Default Risk Exposure (B21)	Out of which:	
					Sovereign exposures (B22)	Exposures to corporates or individuals (B26)
20a. Interest rate contracts	20,000					
20b. Exchange rate contracts	7,774					
20c. Credit-related derivative contracts						
20d. Equity-related derivative contracts	234					
20e. Commodity-related derivative contracts						
20f. Multiple netting sets covered by single variation margin agreement		0	294	412		412
<b>SUBTOTAL</b>	<b>28,008</b>	<b>0</b>	<b>294</b>	<b>412</b>		<b>412</b>

b. Part IIIb Division B - II

(in HK\$'000)

Item	Nature of item						
13.	Margined contracts not covered by recognized netting						
	Type of Contract	Total Notional Amount (B13)	Total Replacement Cost (B14)	Total Potential Future Exposure (B15)	Total Default Risk Exposure (B16)	Out of which:	
						Sovereign exposures (B17)	Corporate exposures (B22)
							Retail exposures (B23)
13a.	Interest rate contracts	20,000					
13b.	Exchange rate contracts	7,774					
13c.	Credit-related derivative contracts						
13d.	Equity-related derivative contracts	234					
13e.	Commodity-related derivative contracts						
13f.	Multiple netting sets covered by single variation margin agreement		0	294	412		412
	<b>SUBTOTAL</b>	<b>28,008</b>	<b>0</b>	<b>294</b>	<b>412</b>		<b>412</b>

**Case 3: Unmargined contracts covered by recognized netting**

In this case, the contracts involved are the same as contracts A1, A2 and A3 in Case 1, except that the three contracts are covered by recognized netting and therefore fall within the same netting set. Also, neither the AI nor the counterparty has posted collateral for the contracts.

**I. Calculation of default risk exposure**

Step 1: Calculation of replacement cost (RC) at the level of netting set

$$RC = \max (V - C; 0) = \max (10 - 25 + 50; 0) = 35$$

Step 2: Calculation of add-on at the level of netting set

*Step 2.1: Calculation of effective notional amount ( $D_i$ ) at the level of hedging set*

From Case 1, we have the following information on each of the derivative contracts:

<b>Contract</b>	<b>Maturity bucket</b>	<b>Residual maturity (<math>M_i</math>)</b>	<b>Supervisory delta (<math>\delta_i</math>)</b>	<b>Adjusted notional amount (<math>d_i</math>) (HK\$'000)</b>	<b>Maturity factor (<math>MF_i</math>)</b>	<b>Effective notional amount (<math>D_i</math>) (HK\$'000)</b> = (a) × (b) × (c)
			(a)	(b)	(c)	
A1	1	0.25	+1	2,484	0.5	1,242
A2	2	5	-1	44,240	1	-44,240
A3	NA	2	-1	19,033	1	-19,033

The effective notional amount of the hedging set that contains contracts A1 and A2 is calculated by using Formula 23AS in §226BU(2) of the BCR as follows:

$$\begin{aligned}
 \text{Effective Notional}_{\text{hedging set}} &= [(D_{A1})^2 + (D_{A2})^2 + 1.4 \cdot D_{A1} \cdot D_{A2}]^{0.5} \\
 &= [(1,242)^2 + (-44,240)^2 + 1.4 * (1,242) * (-44,240)]^{0.5} = 43,379.67
 \end{aligned}$$

*Step 2.2: Calculation of add-on at the level of asset class*

Given the effective notional amounts calculated under Step 2.1, the add-on for each asset class is calculated as follows:

<b>Asset class</b>	<b>Effective notional amount (HK\$'000)</b> (a)	<b>Supervisory factor</b> (b)	<b>Add-on<sup>4</sup> (HK\$'000)</b> = (a) × (b)
Interest rate contracts	43,380	0.5%	216.90
Credit-related derivative contracts	19,033	0.54%	102.78

*Step 2.3: Calculation of add-on at the level of netting set*

$$AddOn^{(aggregate)} = AddOn^{(IR)} + AddOn^{(Credit)} = 216.90 + 102.78 = 319.68$$

Step 3: Calculation of potential future exposure at the level of netting set

$$multiplier = \min \left\{ 1; Floor + (1 - Floor) * \exp \left( \frac{V - C}{2 * (1 - Floor) * AddOn^{(aggregate)}} \right) \right\}$$

$$= \min \left\{ 1; 5\% + (1 - 5\%) * \exp \left( \frac{(10 - 25 + 50) - 0}{2 * (1 - 5\%) * 319.68} \right) \right\}$$

$$= 1$$

$$PFE = multiplier * Addon^{(aggregate)} = 1 * (319.68) = 319.68$$

Step 4: Calculation of default risk exposure of the netting set

$$Default Risk Exposure = alpha * (RC + PFE) = 1.4 * (35 + 319.68) = 496.55$$

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<sup>4</sup> Also see footnote 2.

## II. Reporting arrangement

### Division A - RWA

#### a. Part IIIa

(in HK\$'000)

Item	Nature of item	On-balance sheet exposures	Off-balance sheet exposures				
		Principal Amount (A1)	Principal Amount / Notional Amount (A2)	Credit Equivalent Amount (A3)	Default Risk Exposure (A4)	Risk-weight % (A5)	Risk-weighted Amount (A6) = (A1+A3+A4) x A5
<b>Class XII</b>	<b>Other Exposures</b>						
12a.	Exposures to corporates or individuals not elsewhere reported		30,000		497	100	497
12b.	Premises, plant and equipment, other fixed assets for own use, and other interest in land					100	
12f.	Other exposures not elsewhere reported						
12f(i).							
12f(ii).							
12f(iii).							
12f(iv).							
	<b>SUBTOTAL</b>		<b>30,000</b>		<b>497</b>		<b>497</b>

#### b. Part IIIb

(in HK\$'000)

Item	Nature of item	On-balance sheet exposures		Off-balance sheet exposures			Risk-weight % (A6)	Risk-weighted Amount (A7) = (A2+A4+A5) x A6
		Principal Amount (A1)	Principal Amount after CRM (A2)	Principal Amount / Notional Amount (A3)	Credit Equivalent Amount after CRM (A4)	Default Risk Exposure after CRM (A5)		
<b>Class VIII</b>	<b>Corporate Exposures</b>							
8a.	Rated general corporate exposures							
8a(i).	Risk-weight 20%						20	
8a(ii).	Risk-weight 30%						30	
8b.	Unrated general corporate exposures							
8b(i).	Risk-weight 85%						85	
8b(ii).	Risk-weight 100%			30,000		497	100	497
8b(iii).	Risk-weight 150%						150	
	<b>SUBTOTAL</b>			<b>30,000</b>		<b>497</b>		<b>497</b>

## Division B – Default risk exposure amount

### a. Part IIIa Division B – III

(in HK\$'000)

21. Contracts covered by recognized netting						
Type of Contract	Total Notional Amount (B18)	Total Replacement Cost (B19)	Total Potential Future Exposure (B20)	Total Default Risk Exposure (B21)	Out of which:	
					Sovereign exposures (B22)	Exposures to corporates or individuals (B26)
21a. Interest rate contracts	20,000					
21b. Exchange rate contracts						
21c. Credit-related derivative contracts						
21d. Equity-related derivative contracts	10,000					
21e. Commodity-related derivative contracts						
<b>SUBTOTAL</b>	<b>30,000</b>	<b>35</b>	<b>320</b>	<b>497</b>		<b>497</b>

### b. Part IIIb Division B - II

(in HK\$'000)

Item	Nature of item						
14. Contracts covered by recognized netting							
Type of Contract	Total Notional Amount (B13)	Total Replacement Cost (B14)	Total Potential Future Exposure (B15)	Total Default Risk Exposure (B16)	Out of which:		
					Sovereign exposures (B17)	Corporate exposures (B22)	Retail exposures (B23)
14a. Interest rate contracts	20,000						
14b. Exchange rate contracts							
14c. Credit-related derivative contracts	10,000						
14d. Equity-related derivative contracts							
14e. Commodity-related derivative contracts							
<b>SUBTOTAL</b>	<b>30,000</b>	<b>35</b>	<b>320</b>	<b>497</b>		<b>497</b>	

#### **Case 4: Margined contracts covered by recognized netting**

In this case, the contracts involved are the same as Case 2 and subject to the same margin agreement as described in Case 2, except that the contracts are covered by the same valid bilateral netting agreement and therefore fall within the same netting set.

#### **I. Calculation of default risk exposure**

##### Step 1: Calculation of replacement cost (RC) at the level of netting set

$$RC = \max(V - C; TH + MTA - NICA; 0)$$

$$V = 10 - 25 + 11 + 16 = 12$$

$$RC = \max(12 - 500; 0 + 5 - 450; 0) = 0$$

##### Step 2: Calculation of add-on at the level of netting set

##### *Step 2.1: Calculation of contract-level effective notional amount ( $D_i$ )*

From Cases 1 and 2, we have the following information on each of the derivative contracts:

<b>Contract</b>	<b>Maturity bucket</b>	<b>Supervisory delta (<math>\delta_i</math>)</b>	<b>Adjusted notional amount (<math>d_i</math>) (HK\$'000)</b>	<b>Maturity factor (<math>MF_i</math>)</b>	<b>Effective notional amount (<math>D_i</math>) (HK\$'000)</b>
		(a)	(b)	(c)	= (a) × (b) × (c)
A1	1	+1	2,484	0.3	745.33
A2	2	-1	44,240	0.3	-13,271.95
A4	NA	+0.588	234	0.3	41.31
A5	NA	+1	7,881	0.3	2,364.17

The maturity factor for margined transactions depends on the margin period of risk (MPOR). For daily re-margining, the MPOR is at least 10 business days. In this example, the contracts are not centrally cleared and the requirements in §226BZE(3), (4) and (6) do not apply to the contracts. Hence, the maturity factor for the contracts in the netting set is as follows (the convention of 250 business days in a year is used):

$$MF_i^{(\text{margined})} = \frac{3}{2} \sqrt{\frac{\text{MPOR}_i}{1 \text{ year}}} = 1.5 * \sqrt{\frac{10}{250}} = 0.3$$

*Step 2.2: Calculation of effective notional amount (D<sub>i</sub>) at the level of hedging set*

Contracts A1 and A2 are in the same hedging set but in different maturity buckets. The effective notional amount of the hedging set is calculated by using Formula 23AS in §226BU(2) of the BCR as follows:

$$\begin{aligned} \text{Effective Notional} &= [(D_{A1})^2 + (D_{A2})^2 + 1.4 \cdot D_{A1} \cdot D_{A2}]^{0.5} \\ &= [(745.33)^2 + (-13,271.95)^2 + 1.4 * (745.33) * (-13,271.95)]^{0.5} = 12,761.33 \end{aligned}$$

In the case of Contracts A4 and A5, each contract forms its own hedging set. Hence, the effective notional amount of each hedging set is same as the contract-level effective notional amount.

*Step 2.3: Calculation of add-on at the level of asset class*

Given the effective notional amounts calculated under Step 2.2, the add-on for each asset class is calculated as follows:

<b>Asset class</b>	<b>Effective notional amount</b> (HK\$'000) (a)	<b>Supervisory factor</b> (b)	<b>Add-on<sup>5</sup></b> (HK\$'000) = (a) × (b)
Interest rate contract	12,761.33	0.5%	63.81
Equity-related derivative contract	41.31	32%	13.22
Exchange rate contract	2,364.17	4%	94.57

*Step 2.4: Calculation of add-on at the level of netting set*

$$\begin{aligned} \text{AddOn}^{(\text{aggregate})} &= \text{AddOn}^{(\text{IR})} + \text{AddOn}^{(\text{Equity})} + \text{AddOn}^{(\text{FX})} \\ &= 63.81 + 13.22 + 94.57 = 171.59 \end{aligned}$$

<sup>5</sup> See footnote 2, which also applies in the case of equity-related derivative contracts.

Step 3: Calculation of potential future exposure at the level of netting set

$$\text{multiplier} = \min \left\{ 1; \text{Floor} + (1 - \text{Floor}) * \exp \left( \frac{V - C}{2 * (1 - \text{Floor}) * \text{AddOn}^{(\text{aggregate})}} \right) \right\}$$

$$= \min \left\{ 1; 5\% + (1 - 5\%) * \exp \left( \frac{12 - 500}{2 * (1 - 5\%) * 171.59} \right) \right\}$$

$$= 0.2627$$

$$\text{PFE} = \text{multiplier} * \text{AddOn}^{(\text{aggregate})} = 0.2627 * (171.59) = 45.07$$

Step 4: Calculation of default risk exposure of the netting set

$$\text{Default Risk Exposure} = \text{alpha} * (\text{RC} + \text{PFE}) = 1.4 * (0 + 45.07) = 63$$

## II. Reporting arrangement

### Division A - RWA

#### a. Part IIIa

(in HK\$'000)

Item	Nature of item	On-balance sheet exposures	Off-balance sheet exposures				
		Principal Amount (A1)	Principal Amount / Notional Amount (A2)	Credit Equivalent Amount (A3)	Default Risk Exposure (A4)	Risk-weight % (A5)	Risk-weighted Amount (A6) = (A1+A3+A4) x A5
<b>Class XII</b>	<b>Other Exposures</b>						
12a.	Exposures to corporates or individuals not elsewhere reported		28,008		63	100	63
12b.	Premises, plant and equipment, other fixed assets for own use, and other interest in land					100	
12f.	Other exposures not elsewhere reported						
12f(i).							
12f(ii).							
12f(iii).							
12f(iv).							
<b>SUBTOTAL</b>			<b>28,008</b>		<b>63</b>		<b>63</b>

b. Part IIIb

(in HK\$'000)

Item	Nature of item	On-balance sheet exposures		Off-balance sheet exposures			Risk-weight % (A6)	Risk-weighted Amount (A7) = (A2+A4+A5) x A6
		Principal Amount (A1)	Principal Amount after CRM (A2)	Principal Amount / Notional Amount (A3)	Credit Equivalent Amount after CRM (A4)	Default Risk Exposure after CRM (A5)		
<b>Class VIII</b>	<b>Corporate Exposures</b>							
8a.	Rated general corporate exposures							
8a(i).	Risk-weight 20%						20	
8a(ii).	Risk-weight 30%						30	
8b.	Unrated general corporate exposures							
8b(i).	Risk-weight 85%						85	
8b(ii).	Risk-weight 100%			28,008		63	100	63
8b(iii).	Risk-weight 150%						150	
	<b>SUBTOTAL</b>			28,008		63		63

Division B – Default risk exposure amount

a. Part IIIa Division B – III

(in HK\$'000)

21. Contracts covered by recognized netting						
Type of Contract	Total Notional Amount (B18)	Total Replacement Cost (B19)	Total Potential Future Exposure (B20)	Total Default Risk Exposure (B21)	Out of which:	
					Sovereign exposures (B22)	Exposures to corporates or individuals (B26)
21a. Interest rate contracts	20,000					
21b. Exchange rate contracts	7,774					
21c. Credit-related derivative contracts						
21d. Equity-related derivative contracts	234					
21e. Commodity-related derivative contracts						
<b>SUBTOTAL</b>	<b>28,008</b>	<b>0</b>	<b>45</b>	<b>63</b>		<b>63</b>

b. Part IIIb Division B – II

(in HK\$'000)

14. Contracts covered by recognized netting							
Type of Contract	Total Notional Amount (B13)	Total Replacement Cost (B14)	Total Potential Future Exposure (B15)	Total Default Risk Exposure (B16)	Out of which:		
					Sovereign exposures (B17)	Corporate exposures (B22)	Retail exposures (B23)
14a. Interest rate contracts	20,000						
14b. Exchange rate contracts	7,774						
14c. Credit-related derivative contracts							
14d. Equity-related derivative contracts	234						
14e. Commodity-related derivative contracts							
<b>SUBTOTAL</b>	<b>28,008</b>	<b>0</b>	<b>45</b>	<b>63</b>			<b>63</b>